Essays on equity joint ventures, uncertainty and experience

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Proefschrift

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To my family

PREFACE

This dissertation is the result of my work as a doctoral student at the Department of Organization and Strategy and CentER Graduate School at Tilburg University. Including my undergraduate studies I spent almost a decade in Tilburg. During this period I evolved tremendously as a person and crossed paths with a countless number of interesting people. The support and guidance of many of these people was instrumental in making this dissertation possible. Therefore, I have the following words of appreciation:

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Last but not least, my immense gratitude goes towards my family. My parents' unconditional support has given me the opportunity to study and write this dissertation. I am also greatly indebted to my sister Youtha whom has always made herself available to discuss ideas, give feedback on my work and share the joys and pains of being an academic. For these reasons and so many more, I would like to dedicate my dissertation to my family.

CONTENTS

CHAPTER 1

GENERAL INTRODUCTION

Amidst increasingly global competition during the last decades, we witnessed a sharp increase in interfirm cooperation. As a result, various forms of interfirm cooperation, joint ventures (JVs) in particular, have aroused considerable enthusiasm in recent years among scholars and practitioners (Contractor and Lorange, 2002). I define JVs as equity-based collaborative arrangements whereby two or more organizations each contribute resources, including equity, for the joint pursuit of economic goals (Martin and Salomon, 2003b).

Despite their popularity, JVs have led to a great deal of controversy as they often are unstable or fail to live up to their expectations (Anand and Khanna, 2000). Hence, there remains a clear need to study in more detail how firms can make their JVs live up to their expectations. In this dissertation, I aim to improve our understanding of JVs by looking at several major stages of the life-cycle of a JV. I am particularly interested in JV formation, stability and performance. By considering these JV stages side-by-side, I can raise several new issues which have not been addressed and can only be addressed by more integrative research. Namely, it allows me to compare arguments and variables used to explain different JV stages, and to assess whether certain factors have a different effect in one stage than in another stage.

More specifically, this dissertation consists of four studies in which I examine the roles of different types of uncertainty and experience on the successive stages in the lifecycle of a JV. In these studies, I respectively look at JV formation (chapters 2 & 3), changes in JV terms over time (chapters 2 & 4), and performance consequences of JVs (chapters 2 & 5). To

do so, I draw on several theoretical perspectives including real option theory, learning theory and transaction cost theory. I aim to contribute to the existing literature by resolving some of the apparent contradictions between these theories. More specifically, I aim to refine them and to specify their boundary conditions more accurately.

RESEARCH QUESTIONS, SEQUENCE AND KEY FINDINGS

Although each of the four essays in this dissertation has its own specific research question, I aim to address a broader overarching research question:

> *How do different types of uncertainty and experience influence joint venture formation, stability and performance?*

In an ever more competitive world managers are increasingly confronted with a variety of sources of uncertainty (Miller, 1993). At the same time, they are pushed to learn from their experiences in order to remain competitive (Barkema, Baum and Mannix, 2002). Accordingly, attention has shifted toward understanding how uncertainty and experience influence various managerial decisions and outcomes. As a result, these factors have become prominent in research in strategic management and international business research. Not surprisingly, both uncertainty and experience have been found to influence various aspects of JVs including JV formation, stability and performance (e.g. Gatignon and Anderson, 1988; Reuer, Zollo, and Singh, 2002). Various theoretical perspectives on JVs such as learning, transaction cost and real option theory provide different and sometimes contradictory insights into the role of uncertainty and experience (e.g. Leiblein, 2003). Simultaneously, empirical studies have yielded mixed results regarding uncertainty and experience. In the four essays of

my dissertation I aim to resolve several of these apparent empirical and theoretical contradictions.

In the second chapter, I provide a comprehensive synthesis and extension of the real option literature on JVs, contributing in three main areas. First, I examine major alternative theoretical perspectives on JVs – learning, bargaining, transaction cost and agency theory – to elaborate how they complement or contradict real option predictions. Second, I compare arguments and variables used to explain different JV stages and highlight research opportunities, with the aim of improving the integration within the real option literature on JVs. Third, I discuss and extend research on behavioral effects and potential decision-making biases when making real option (JV) investments. Overall, I offer new predictions and suggestions for a better integration within the real option literature, and between real option and related literatures on JVs.

In the third chapter, I examine empirically the boundaries of real option logic. Uncertainty is widely held to be a principal motivation for using JVs to expand internationally, as well as a predictor of investments in real options. I build on a distinction between forms of uncertainty which resolve endogenously versus exogenously. Exogenous uncertainty is uncertainty of which the resolution is unaffected by the actions of the firm, while endogenous uncertainty is resolved (at least partially) by the actions of the firm itself over time. I theorize that only exogenous uncertainty will have the impact predicted by most extant real option theory. Using a sample of 6,472 Sino-foreign JVs established between 1979 and 1996, I show that investors' choices of equity shares are indeed consistent with real options predictions when uncertainty resolves exogenously, but not when uncertainty resolves endogenously. This study contributes to the literature by advancing our understanding of the boundary conditions for real option theory and by showing that the effect of uncertainty on JV ownership is conditional.

In the fourth chapter, I examine the evolution of international subsidiaries including joint ventures and wholly-owned subsidiaries. More specifically, I predict and find that firms whose ownership levels in international subsidiaries are misaligned with the levels of uncertainty in the external environment adapt their ownership levels to re-align with the environment. I argue that experience and shifts in the levels of external uncertainty have an impact on subsidiary evolution. However, the impact of these factors is contingent on the source and type of uncertainty, and the direction of the shift in uncertainty. Using a sample of 726 Japanese-foreign subsidiaries established in 38 different host countries, I find support for my hypotheses. Overall, this study improves our understanding of how subsidiaries evolve and adapt to their external environment.

In the fifth chapter, I extend research on the link between prior JV experience and the amount and distribution of the value generated by the JV. More specifically, I investigate how the prior JV experiences of each of the JV partners, and the level of asymmetry in their respective JV experience, have an impact on value creation and value appropriation. I test the hypotheses, using the event study methodology, on a sample of over 576 JVs derived from Thomson Financial's Security Data Corporation (SDC) database. This paper contributes to the literature on JVs by considering the experience of all the JV partners and by distinguishing between the total value created and the way value is distributed among each of the partners. In addition, I contribute to the research on organizational learning by looking at the degree of fit between the prior JV experience of each of the JV partners and how this influences value creation in a different way than the subsequent distribution of the value created. Furthermore, I argue that the need for experience fit is contingent on several factors, internal and external to the JV.

A NOTE ON THE COHERENCE BETWEEN CHAPTERS

Although specifics of the research question, theoretical framework, research design, and (where applicable) empirical setting may differ across four studies in this dissertation, there is a significant conceptual overlap between the chapters. The common thread through the four studies in this dissertation is a focus on how different types of uncertainty and experience have an impact on major life-cycle stages of a JV.

Chapter 2 deals with this question in a conceptual way and acts as an overarching chapter. More specifically, the effects of different types of uncertainty on each of the JVs' life-cycle stages are discussed in detail from several key theoretical perspectives such as real option theory and learning theory. In chapter 3, I use real option theory to extend and test some of the arguments from chapter 2. In particular, I contrast the effects of two distinct types of uncertainty, i.e. exogenous and endogenous sources of uncertainty, on the equity distribution of JVs. In chapter 4, I look at the determinants and the implications in terms of subsidiary dynamics of misaligned ownership levels. In order to determine the extent to which ownership levels are misaligned, I build on the findings in chapter 2, several of the arguments I made in chapters 2 and 3, and elements of the empirical model from chapter 3. In chapter 5, I use learning arguments to investigate how prior JV experience determines how much value is created and how this value is distributed among the partners. In doing so, I extend some of the learning arguments in chapters 2 and 4. More specifically, I argue that not only absolute levels of prior JV experience matter but that the level of asymmetry between JV partners' prior JV experience also determines how much value is created and how this value is distributed between the JV partners.

Although there is less theoretical overlap between chapters 3 and 5, I expect and find that several of the sources of uncertainty I investigated in chapter 3 have an indirect effect on value creation as examined in chapter 5. In particular, I show in chapter 5 that economic

uncertainty, cultural distance and the scope of the JV, respectively, moderate the effect of experience asymmetry on value creation. Furthermore, I show that the effect of experience asymmetry on value creation is also contingent on the ownership distribution of the JV – i.e., the dependent variable in chapter 3 becomes a meaningful contingency in chapter 5. Chapters 4 and 5 share a learning framework and an uncertainty focus and variable.

Overall, besides making individual contributions to the real option and learning literatures respectively, the four papers which comprise this dissertation aim to make a broader contribution to the JV literature by adding to our understanding of the influence of uncertainty and experience on the different stages of the life-cycle of a JV.

CHAPTER 2[1]

JOINT VENTURES AND REAL OPTIONS: AN INTEGRATED PERSPECTIVE

ABSTRACT

We provide a comprehensive synthesis and extension of the real option (RO) literature on joint ventures (JVs), contributing in three main areas. First, we examine major alternative theoretical perspectives on JVs – learning, bargaining, transaction cost and agency theory – to elaborate how they complement or contradict RO predictions. Second, we compare arguments and variables used to explain different JV stages – initial RO explicitness and equity shares, JV stability, and performance consequences – and highlight research opportunities. Third, we discuss and extend research about behavioral aspects of making RO (JV) investments. Overall, we offer new predictions and suggestions for a better integration within the RO literature, and between RO and related literatures on JVs.

[1] This chapter is the result of joint work with Xavier Martin. It appeared in 2007 in *Advances in Strategic Management*, 24: 107-148.

INTRODUCTION

In recent years, real option (RO) theory has emerged as an important approach to understand and value strategy under uncertainty. Accordingly, numerous types of investments such as R&D projects, taking out patents, investing in human capital, subcontracting, and entering into joint ventures (JVs), which are all characterized by uncertain outcomes, have been studied from a RO perspective (e.g., Bowman and Moskowitz, 2001; Chi and Levitas, 2007; Nerkar, Paruchuri and Khaire, 2007; Fister and Seth, 2007; Van Mieghem, 1999; Reuer and Leiblein, 2000).

In this paper, we focus on one type of investment, namely JVs, which we define as equity-based collaborative arrangements whereby two or more organizations each contribute resources, including equity, for the joint pursuit of economic goals (Martin and Salomon, 2003b). It has long been established that firms often use JVs to enter into unfamiliar and risky product-market and geographic areas (Aharoni, 1966; Harrigan, 1988b). Accordingly, though JVs may vary in their form and functional purpose(s), they are generally surrounded by high levels of uncertainty (Martin, Mitchell and Swaminathan, 1995; Krishnan, Martin and Noorderhaven, 2006).[2] This is especially – but not exclusively – the case for international joint ventures (IJVs), which are subject to powerful sources of uncertainty such as cultural differences and the burdens of operating across multiple locations and jurisdictions (e.g., Martin and Salomon, 2002, 2003a; Reuer and Tong, 2005).[3] Furthermore, JVs allow for, and are subject to, ongoing adjustments in the terms of the agreement (and the relationship among parent firms). These features make JVs – and IJVs in particular – both suitable and important to study from a RO perspective. Indeed, the application of RO theory to JVs has led to numerous insights and an improved understanding of collaborative ventures. Still, there

[2] For a review of JV types, purposes and scope, see Pisano, Russo and Teece (1988) and Martin (2002).
[3] However, we believe that our arguments are also broadly relevant for other types of JVs, which face their own distinct sources of uncertainty. For instance, ventures for joint product introduction must deal with uncertainty concerning design acceptance by buyers and regulators, competitive reaction, etc. (Pisano, Russo & Teece, 1988; Martin & Mitchell, 1998).

remain a number of promising opportunities for future research on JVs from a RO perspective, and several theoretical and empirical gaps and inconsistencies exist. Therefore, our objective in this paper is to provide a comprehensive synthesis and extension of the RO literature on JVs. Where relevant, we offer new testable propositions. We aim to make contributions in three areas.

Firstly, several theoretical perspectives besides RO theory can be used to study JVs. In fact, cooperative ventures lend themselves to a particularly broad range of explanatory perspectives, which sometimes lead to sharply differing conclusions (Martin, Mitchell and Swaminathan, 1994; Cuypers and Martin, 2006a). Therefore, we revisit the most important related literatures on JVs – including learning, transaction cost, bargaining models and agency theory – and link them to the RO literature, with a view to elaborate on the relationships between these theories.

Secondly, one of the most attractive features of RO theory is that it is a dynamic perspective that can explain each of a JV's stages, from formation to subsequent adjustment and post-JV outcomes (sale, dissolution, etc.). To make the best of such a dynamic theory requires consistency in researching sequential stages. Although various JV stages have been duly studied from a RO perspective, there are differences in the scope and content of studies of the various JV stages. Therefore, we compare the theoretical arguments and explanatory variables used to explain different JV stages, to highlight important research opportunities and offer predictions and suggestions towards a better integration within the RO literature.

Finally, we address the behavioral aspects of making RO investments. Recent developments, including some applications to the RO literature, have not been fully incorporated into JV research. We examine these ideas and discuss their implications for JV research.

EXPLICIT AND IMPLICIT REAL OPTIONS IN JOINT VENTURES

Shortly after the formalization of financial option theory, scholars recognized that financial options logic could be applied to corporate investments (Myers, 1977). These options on non-financial assets have been labeled "real options" and can be seen as contingent investment commitments that secure future decision rights (Trigeorgis, 1993).

The insights and techniques from financial option theory have shown that the traditional Net Present Value (NPV) valuation approach does not fully capture the value of an investment. The traditional NPV should be expanded to take into account management's flexibility to adapt to unexpected developments (Trigeorgis, 1995). Such flexibility is valuable because it can limit investors' downside losses to their initial investment, while preserving the upside potential. Thus, the expanded NPV approach should incorporate both a passive NPV component and a dynamic option value component (Pindyck, 1988):

Value of an investment = "passive NPV" of expected cash flows + "dynamic real option" value

However, these two different value components usually have to be captured in different ways, requiring differently structured investments – in terms of share of the total investment, absolute size of the investment, scope and sequencing of the project, etc. (e.g., Reuer and Tong, 2007). For instance, with regard to JV investments, capturing the passive NPV component requires taking a larger percentage stake in the JV, holding its size constant, in order to capture as much of the cash flow as possible; while capturing the dynamic option component requires taking a smaller stake (Chi and McGuire, 1996), which secures future decision rights while minimizing the initial sunk costs (and therefore downside risk). Meanwhile, an option-like investment by a firm to seek new technology (without partner)

corresponds with a smaller (absolute) investment while an investment to capture the NPV component corresponds with a larger (absolute) investment (Hurry, Miller and Bowman, 1992).

Among the first to apply RO theory to JVs, Kogut (1991) argued that firms can use a JV to capture the upside potential of an investment by buying out the partner in a later stage when favorable information becomes available, while limiting their exposure to the initial investment. This option to acquire can be explicit, but this is not a necessity.[4] It remains possible, when there is no ex ante contractual specification of the strike price, or of the party holding the acquisition right, for the parties involved to negotiate the acquisition and sale of their share at a later stage. Therefore, a JV has at least an embedded implicit call option[5] - i.e. an option to acquire a partner's stake (Chi and McGuire, 1996; Chi, 2000). Furthermore, Chi and McGuire (1996) and Chi (2000) argued that the presence of an explicit option clause will depend on three conditions: (1) the level of uncertainty,[6] (2) the anticipation of a change in the relative bargaining power of the two parties during their collaboration, and (3) ex ante asymmetry between both parties in their expected pay-offs of the option. Only the first determinant has received empirical attention. Reuer and Tong (2005) studied empirically the determinants of having an explicit option to acquire additional equity in a JV making use of transaction costs theory and RO theory arguments. They found that the likelihood that a firm has an explicit call option to acquire equity in an IJV is a function of property rights, political, and diversification-related uncertainty, but not of cultural distance between partners' home countries – though only a very small proportion of JV listed in their sample,

[4] An explicit option is a contractual clause that specifies the terms including the conditions under which additional equity can be acquired from a partner (Reuer & Tong, 2005). Chi and Seth (2002) provided an extensive overview of different option specifications. These include options with predetermined exercise prices, flexible or fixed termination dates, or a predetermined pricing mechanism.

[5] The holder of a call (put) option has the right but not the obligation, to buy (sell) an underlying asset at the contractually determined strike price until (American option) or at (European option) a certain expiry date (maturity).

[6] Option valuation models assume that it is possible to specify the probability distribution of the future value of an asset. Therefore, the concept of uncertainty used in RO theory is actually closer to what Knight (1921) refers to as risk. Nevertheless, we will refer to this as "uncertainty" as this is done throughout most of the literature.

drawn from the SDC database, had explicit options (1% in general, and 4% of minority holdings). Altogether, there is some support for the premise that JVs serve as ROs (Kogut, 1991; Chi and McGuire, 1996; Reuer, 2000, 2002; Reuer and Leiblein, 2000) – albeit mostly implicit ROs. Further research in this area is thus warranted.

Researchers have also examined the governance implications of implicit and explicit ROs. Chi (2000) and Reuer and Tong (2005) argued that explicit call options in JVs are one of several contractual safeguards that can be used to reduce transaction costs. More specifically, Reuer and Tong (2005) argued that an explicit call option enables a firm to take control of a JV when it observes that its partner is cheating (for instance, misappropriating knowledge), or alternatively that the presence of an explicit call option might reduce the chance of such opportunistic behavior. However, Chi and Seth (2002) and Seth and Chi (2005) argued that the presence of an explicit call option may weaken the other party's incentive to contribute to the JV beyond the value of the strike price of the option, as all value resulting from these additional contributions will be captured by the call option holder. Put together, these arguments suggest important questions for future research. Would monitoring the other party in a JV with an explicit call option clause, in order to know when to strike the option and take control of the venture, be subject to greater or lesser costs and constraints than without an explicit option clause – and under what conditions? More generally, how would negotiation and monitoring costs compare, considering the stages identified above – from initial JV setup to potential renegotiation to option exercise or other JV conclusion? Before turning to the later stages, we examine another critical initial decision regarding JVs as ROs – namely, the initial distribution of equity shares among JV partners.

THE INITIAL DISTRIBUTION OF EQUITY AMONG JOINT VENTURE PARTNERS

Real Option Theory

Several scholars have examined the initial formation of JVs from a RO perspective (e.g., Chi and McGuire, 1996; Folta, 1998)**.** One key finding is that the options embedded in JVs will have an impact on the distribution of the equity stakes. On the one hand, an investor who tries to capture the static NPV part will take an as large as possible share in the JV, to fully capture the JV's future cash flows. In the extreme, this will lead to an acquisition instead of a JV (Seth and Kim, 2001). On the other hand, an investor who aims to capture the dynamic RO part will invest in a smaller share of the JV because this way (s)he limits the downside risk while preserving the opportunity to capture the upside potential (Chi and McGuire, 1996; Reuer, 2002).

The value of the dynamic option part is a function of the same five factors that determine the value of financial options, i.e.: the value of the underlying asset, the strike price, the time to maturity, the risk-free rate and the uncertainty surrounding the underlying asset (Seth and Kim, 2001). Of these, uncertainty has been by far the most prominent throughout the RO literature on JVs, because of its natural appeal to strategy and international business scholars.

Chi and McGuire (1996) argued that the value of the options embedded in JVs is positively related to market, partner-related, and legal uncertainty. Hence, higher levels of uncertainty in general, and these three forms of uncertainty in particular, should lead to investors taking a smaller share in JVs. Using a sample in the biotechnology industry, Folta (1998) studied the trade-off between administrative control and commitment. He found that uncertainty about the partner, exogenous technological uncertainty, and competitive uncertainty all influence the likelihood of choosing a collaborative venture over an

acquisition. However, when a distinction was made between two types of collaborative ventures – minority investments and JVs – the results showed that only exogenous technological uncertainty encouraged the formation of JVs as call options (rather than acquisitions). Multiple forms of uncertainty were associated with taking RO positions in the form of minority equity investments (rather than acquisitions).

In order to explain the apparent inconsistencies found in past research (e.g., Folta, 1998; Reuer and Leiblein, 2000), Cuypers and Martin (2006b, 2010) sought to refine and expand conceptually and empirically the boundaries of RO theory, with application to the ownership distribution of JVs. They built on the distinction between forms of uncertainty that resolve endogenously and exogenously (Roberts and Weitzman, 1981): Exogenous uncertainty is uncertainty of which the resolution is unaffected by the actions of the firm, while endogenous uncertainty is resolved (at least partially) by the actions of the firm itself over time.[7] Cuypers and Martin (2006b, 2010) theorized that only exogenous uncertainty would have the impact suggested by RO theory. The case of exogenous uncertainty corresponds to models of financial options, where it is assumed that uncertainty is resolved independently of the investor's behavior. Moreover, Dixit and Pindyck (1994) argue that exogenous uncertainty increases the value of waiting for new information and makes committing resources early less attractive, because investing will not influence how uncertainty is resolved. Hence, RO models should be applicable.

However, when uncertainty resolves endogenously, RO logic is subject to three objections. Firstly, because investors are no longer price-takers, conventional option valuation models break down. Secondly, firms will have an incentive to invest and commit resources rather than wait (Dixit and Pindyck, 1994). Thirdly, the flexibility of targets renders RO theory problematic as a decision-making template (Adner and Levinthal, 2004a). For

[7] Li, James, Madhavan and Mahoney (2007) also touch upon the distinction between exogenous and endogenous uncertainty in their general review of RO research.

these reasons, RO predictions will not accurately describe firms' responses to endogenous uncertainty.

Using a sample of 6,472 Sino-foreign JVs established between 1979 and 1996, Cuypers and Martin (2006b, 2010) found, as predicted by RO theory, a negative relationship between the initial equity share taken by the foreign partner and three sources of exogenous uncertainty: economic conditions, local institutions, and exchange rate fluctuations. Conversely, they found no such relationship for three sources of endogenous uncertainty: cultural uncertainty, uncertainty resulting from the scope of JV operations, and uncertainty associated with R&D activities. Indeed, null-hypothesis tests showed that these endogenous sources of uncertainty have no significant effect on the distribution of equity shares among partners. In summary, Cuypers and Martin (2006b, 2010) theorized and showed empirically that initial alliance governance decisions, as evidenced by initial equity stakes in IJVs, conform to RO predictions when uncertainty is exogenous but not when uncertainty is endogenous. Furthermore, they provided a first empirical test which is more consistent with Chi and McGuire's (1996) model by considering the entire range of the ownership distribution rather than just the choice between collaborative ventures and acquisitions, or minority and majority JVs.

Alternative Theories

A number of other theories have been used to study the initial formation of JVs - for an overview of these, see Cuypers and Martin (2006a). This raises the question of whether and how these theories contradict or complement RO theory. Next, we briefly discuss three alternative approaches that have been used to examine governance decisions including the distribution of JV equity shares.

Transaction Costs Economics (TCE). Transactions are arrayed on a continuum between markets and hierarchy. On this continuum, the optimal degree of integration

(control) reflects the trade-off between shirking costs that tend to arise when the parties are brought into the same organization and cheating costs due to opportunism by arm's length parties (Williamson, 1985; Hennart, 1993). In TCE, behavioral uncertainty figures as an endogenous factor that can be addressed via governance decisions. Furthermore, exogenous uncertainty acts in TCE theory as a conditional factor: It exacerbates other characteristics of the transaction (especially asset specificity) that increase ex-ante and ex-post costs of contracting (e.g., Williamson, 1985; Leiblein, Reuer and and Dalsace, 2002; Lu and Hébert, 2005).[8] However, few TCE studies have examined JV equity shares. Furthermore, these studies have yielded mixed results regarding uncertainty – especially regarding exogenous uncertainty.

Gatignon and Anderson (1988) studied the choice between full ownership and shared ownership, and the ownership level in case of shared ownership. They argued that higher levels of control, through equity ownership, are preferred in case of higher asset specificity – especially in combination with external (exogenous) uncertainty. Although R&D intensity, advertising intensity, and marketing asset specificity, were indeed all associated with a preference for full ownership, the interactions between them and external uncertainty were insignificant. Furthermore, Gatignon and Anderson (1988) were generally unsuccessful in explaining intermediate levels of ownership when ownership is shared. Similarly, Chen, Hu and Hu (2002) failed to find a significant relationship between R&D and advertising intensities, respectively, and intermediate levels of ownership.

Delios and Beamish (1999) focused mainly on the nature of the resources that the foreign firm contributes to the IJV and argued that as asset specificity increases, the foreign

[8] Williamson (1985: 59) emphasizes the conditional effect of exogenous uncertainty: "The influence of [exogenous] uncertainty on economic organizations is conditional. Specifically, an increase in parametric [i.e. exogenous] uncertainty is a matter of little consequence for transactions that are nonspecific." Leiblein (2003) concluded that empirical findings in the TCE literature are consistent with Williamson's (1985) argument that exogenous uncertainty has a conditional effect. A few studies have postulated a direct effect of exogenous uncertainty on make-versus-buy decisions, but reported mixed or inconsistent results (e.g., Walker & Weber, 1984, 1987).

firm will take a higher equity position in order to reduce the increased hazards of opportunistic behavior by the other party. However, their results suggest ambiguous effects of transactional characteristics on the ownership distribution of IJVs.

Bargaining Perspective. The ownership distribution of a JV is the outcome of negotiations in which relative power is a deciding factor (Fagre and Wells, 1982). Generally, it is assumed that partners prefer full ownership to gain more control and greater payoffs from the venture. Subsequently, the relative bargaining power between both parties explains deviations from full ownership. However, the preferred ownership structure predicted by other theories could also serve as a starting point and the bargaining power of the venture's parties can then be used to explain deviations from the starting point (Blodgett, 1991).

A wide range of factors seem to influence bargaining power, and thereby the equity distribution (Kobrin, 1987). Fagre and Wells (1982) found a partner's level of ownership to be positively related to its advertising intensity, its provision of market access, and the amount of technology that it contributes; and negatively related to its number of competitors. Blodgett (1991) found that partners who contribute technology tend to have a higher initial share in the JV, in particular when the other party only contributes local knowledge and marketing resources. Furthermore, government restrictions may limit the bargaining power of the foreign party by restricting the range of ownership it can bargain for (Blodgett, 1991). However, the exogeneity of uncertainty-causing factors such a government regulation is not addressed in the bargaining perspective, which tends to focus on firm-level determinants of bargaining power.[9] In general, bargaining power seems to be negatively related to the need for complementary assets from the other party, and positively related to the contribution the firm makes to the JV.

[9] Some studies in the bargaining power literature have looked at the effects of government restrictions on mode of entry. However, to our knowledge, they have focused almost exclusively on the choice between shared ownership and sole ownership (e.g., Gomes-Casseres, 1990). Only Blodgett (1991) has examined the effects of government restrictions on the ownership distribution of JVs from a bargaining power perspective.

Agency Theory. The ownership structure of companies influences agency costs, i.e. those inefficiencies resulting from the differing objectives of separate parties (Jensen and Meckling, 1976). Foreign partners depend on the effort of the local partner to make the JV succeed. However, the local partner only has an incentive to put effort into the JV to the extent that it receives benefits for its contribution. These benefits, in turn, are proportionate to the ownership share that the local partner holds since the distribution of profits of the JV is typically based on the ownership distribution of the JV. Hence, the local partner's effort will depend on the share in the JV it owns. The foreign partner can reduce the resulting agency costs by taking a smaller share in the venture (Nakamura and Yeung, 1994). Therefore, uncertainty about the behavior of the other party in the JV is endogenous. However, the foreign partner also has to avoid spillovers to potential competitors, in particular of intangible assets, by protecting the property rights of its resources. Nakamura and Yeung (1994) argued that the likelihood of such spillovers decreases less than proportionally as the foreign partner's share in the JV increases. Using data on technology-based US subsidiaries in Japan, they found, as predicted, that JV ownership share is determined by a combination of spillover and agency considerations. Furthermore, they reported ownership differences across different industries, which they attributed to differences in the level of reliance on intangible assets – which is endogenous – rather than an exogenous industry condition.

Chi and Roehl (1997) distinguished between ownership level and control in JVs. More specifically, they argued that cheating cost could be reduced by means of more control - measured by the number of key managerial positions held in the venture. Shirking costs, on the other hand, can be reduced by giving away more of the venture's payoff - measured by the level of equity ownership. Such shirking costs depend on how important and measurable a party's effort is to the overall success of the venture. Chi and Roehl (1997) found positive relationships between the amount of discretionary training provided by the foreign partner,

the proportion of JV output distributed by the foreign partner, and the dissimilarity between the local and foreign partner, respectively, and the foreign partner's equity share. This indicates that the initial ownership distribution serves to align incentives when one party's expected contribution is important to the overall performance of the venture yet is hard to measure, rather than to increase control and thereby reduce the costs of making specific investments. Thus, Chi and Roehl (1997) described how sources of endogenous uncertainty affect equity shares. It is noteworthy that these sources of uncertainty can be controlled by the partners. However, this research did not address exogenous uncertainty.

Conclusion

Several theoretical perspectives besides RO theory can be used to study the formation of JVs (see Table 1). Furthermore, based on the above discussion, we can identify areas of overlap and complementarity with these perspectives. Firstly, TCE and agency theory focus primarily on behavioral uncertainty, which is endogenous. These theories have contributed to the analysis of endogenous uncertainty as it affects JV equity share. However, they have not yielded strong generalizable results regarding exogenous uncertainty. This may be because, in TCE theory, exogenous environmental uncertainty is of interest not as a direct effect but as an interactive effect (and likewise, more implicitly, in agency theory). With respect to exogenous uncertainty, which we know to influence equity shares too, RO theory has proven itself to be a most promising starting point (Folta, 1998; Cuypers and Martin, 2006b). Thus, theoretical arguments and the empirical evidence in the literature dedicated to each theory suggest that TCE and agency theory hold promise as complements to RO theory, with RO theory shedding light on exogenous uncertainty (Cuypers and Martin, 2006b, 2010), while the other theories shed light on endogenous uncertainty (Cuypers and Martin, 2006a).[10]

[10] Other JV studies have contrasted TCE and RO theory in different ways. Folta (1998) argued that RO theory and TCE contradict rather than complement each other. Specifically, he argued that TCE emphasizes the use of commitment to reduce uncertainty, while RO theory emphasizes flexibility to deal with uncertainty. Furthermore, he proposed that there is a trade-off between these two stances, and that this trade-off is more

Table 1: The Initial Distribution of Equity among Joint Venture Partners: A Comparison of Perspectives

Theory/Approach	Unit of Analysis	Focus (goal assumed)	Predicted Effects on Initial Equity Share Taken by the Focal (Foreign) Partner		Selected Studies*
			Exogenous Uncertainty	Endogenous Uncertainty	
Real Option Theory	Option, i.e. an investment sequence	Investment value maximization via downside risk minimization	Direct effect, negative	No effect	Chi & McGuire (1996) Cuypers & Martin (2006a), (2006b), and (2010) Folta (1998)
Transaction Cost Economics	Transaction	Transaction cost minimization	Conditional effect (positive moderation)	Direct or conditional (positive moderation) effect	Chen, Hu & Hu (2002) Delios & Beamish (1999) Gatignon & Anderson (1988)
Bargaining Perspective	Firm dyad (or firm-government dyad)	Maximization of the share of benefits (relative to the partner)	(Mostly ignored)	Bargaining power, obtained via control over resources and uncertainty, is positively associated with initial ownership share.	Blodgett (1991) Fagre & Wells (1982) Kobrin (1987)
Agency Theory	Principal and agent	Agency costs minimization and effort maximization	(Mostly ignored)	Direct effect, depending on shirking vs. spillover or cheating costs	Chi & Roehl (1997) Nakamura & Yeung (1994)

* All studies listed in the table are discussed in the text above.

prominent under conditions of high uncertainty. Conversely, Chi (2000) and Reuer and Tong (2005) argued that explicit call options in JVs are one of several contractual safeguards that can be used to reduce transaction costs – thus suggesting that RO theory and TCE are overlapping. Clearly, these studies raise interesting questions for future research, the most critical of which we outlined above in the section dealing with JVs as (explicit) ROs. On balance, however, current empirical evidence in studies of initial JV equity stakes suggests that RO theory and TCE are complements.

Secondly, studies from a bargaining perspective have provided limited insight into exogenous uncertainty. Still, this perspective may complement RO theory, as follows: The exercise of bargaining power might explain some deviations in initial equity shares relative to what RO theory would indicate. Given that no empirical study has touched upon this, it remains unclear whether or not, and in which direction, relative bargaining power can actually explain deviations from the initial ownership distribution predicted by RO theory. This too represents an opportunity for future research.

In this section, we have highlighted the need for – and rewards from – a more precise conceptualization of uncertainty when studying the initial distribution of equity among JV partners. There is a fundamental difference between endogenous uncertainty and exogenous uncertainty. This calls for a more explicit and elaborate argumentation as to what theory, or combination of theories, is suitable given the sources of uncertainty on hand. TCE and agency theory hold promise as complements to RO theory. Furthermore, the bargaining perspective may be useful to explain some deviations from normative RO models. Many of these insights, starting with the importance of conceptualizing uncertainty carefully, also stand to be relevant in studying later JV stages from a RO perspective. Given this, we turn next to the stability and change in JVs following their formation.

THE STABILITY AND EVOLUTION OF JOINT VENTURES

Real Option Theory

Another aspect of JVs that has received attention from a RO perspective is the stability of JVs after their formation. JV instability – or more generally evolution – can refer to a number of different outcomes: joint or unilateral dissolution, termination of the JV, a partial change in ownership, a full buyout of one partner by the other, or (in rare cases) a (partial) sale to a third party. Each outcome may have different causes, as described below, but in all cases

there is a change in the ownership and/or activity of the JV, which indicates a change in option terms and/or an exercise of the option.

According to RO theory, the holder of a (call) option will hold onto the option either until it expires, meaning that the joint activity ceases; or until a positive signal occurs, i.e. the value of the underlying asset exceeds the strike price at which the firm can increase its equity share. This discrete investment logic distinguishes a RO investment from other path-dependent and incremental investment processes (Adner and Levinthal, 2004a).

Kogut (1991) examined the effect of demand uncertainty on the timing of the exercise of call options, when one JV partner buys out the other. Using a sample of 92 manufacturing JVs, he found that the timing of exercising the option is determined by positive product market signals, while negative signals do not affect the stability of the JV. This asymmetry in the effects of positive and negative signals, combined with the discrete nature of changes in ownership structure, is a defining characteristic of JVs as ROs.

Similarly, Miller and Folta (2002) and Folta and Miller (2002) studied the timing decision to exercise ROs. Miller and Folta (2002) argued that the optimal time to exercise real call options depends on six factors: (1) the current dividends, (2) the exercise price, (3) the residual resource value, (4) the discount rate, (5) the call option value and (6) the nature of the option (compound vs. simple). In turn, they argued that most of these six factors are determined by a number of other factors.[11]

Folta and Miller (2002) examined empirically the timing decision to strike real call options embedded in biotechnology equity partnerships, by looking at the acquisition of additional equity by one party. They found that the value of the underlying asset and the number of parties in the JV increase, while the level of technological uncertainty decreases,

[11] *Current dividends* are a function of market size, first-mover advantages, and learning opportunities. The *residual resource value* is determined by the uniqueness, transferability to other markets, and durability of the underlying resources. The *exercise price* depends on whether there is an explicit contractual option, and the proprietariness of the option. The *value of the option* depends on the amount of exogenous uncertainty, the threat of preemption, and the presence of unique complementary resources (Miller & Folta, 2002).

the likelihood that an option is exercised. Furthermore, they looked at interaction effects and found that the effect of the value of the underlying asset, and the effect of the number of parties on the timing of striking the option, both differ under different levels of technological uncertainty. They also found some evidence, albeit weak, that the presence of an explicit option decreases the likelihood that options are struck. This result contradicted Miller and Folta's (2002) prediction.

Finally, Vassolo, Anand and Folta (2004) studied empirically both the abandonment decision and the striking of options in collaborative ventures in the biotech industry. Consistent with RO theory, they found a negative relationship between industry uncertainty and the technological distance between the focal alliance and the parent's portfolio of other alliances, respectively, and the likelihood of the alliance being divested. Additionally, Vassolo, Anand and Folta (2004) found evidence of a negative relationship between the technological distance between the firm and the focal alliance, and the likelihood of striking the option. However, they failed to find any such relationship for technological uncertainty. Like Folta and Miller (2002), they found that explicit option agreements decrease the likelihood of buyouts and divestures.

Alternative Theories

A number of other approaches have been used to explain alliance evolution and instability (Gulati, 1998). Most prominent among them are transaction cost economics, the bargaining perspective (power-dependence), and organizational learning and experience (Martin, Mitchell and Swaminathan, 1994).[12] In addition, there are large differences across and within these approaches in the way instability is defined or operationalized. These different operationalizations of instability each correspond to different outcomes from a RO

[12] We discuss learning in this section because the range of its manifestations and effects is better understood in connection with alliance evolution and (in)stability than solely in connection with terms at founding (initial distribution of equity). Conversely, the literature on agency theory has relatively little to say about alliance instability (other than as adjustment of terms, following a logic similar to transaction cost predictions), so we do not treat it separately in this section.

perspective. On the one hand, several studies focused on JV termination as JV instability (e.g., Barkema and Vermeulen, 1997), which from a RO perspective, corresponds with letting options expire. On the other hand, some scholars studied partial or full buyouts (e.g., Balakrishnan and Koza, 1993), which from a RO perspective correspond with striking the option. Furthermore, some studies did not distinguish between both outcomes (e.g., Blodgett, 1992). We will now briefly discuss the theoretical approaches and findings most predominant in the literature: transaction cost economics, the bargaining perspective, and learning theory.

Transaction Costs Economics (TCE). Although TCE is sometimes held to be a static theory that focuses on ex ante governance decisions, Williamson (1991) argued that TCE can be the basis of a comparative analysis that explains the adaptation of governance structures – and specifically JVs – to changing circumstances. Following this line of reasoning, some studies have examined the post-formation dynamics of JVs from a TCE perspective. Lu and Hébert (2005) argued that the survival of a JV depends on the fit between the initial conditions, i.e. the characteristics of the transaction and the environment, and the chosen governance structure at the formation of the JV. They found that higher levels of control in IJVs in the presence of high asset specificity (i.e., fit between governance arrangement and transaction conditions) lead to higher IJV survival rates. Reuer and Ariño (2002) also studied the impact of the initial conditions of JVs on their stability, as measured by the absence or presence of a contractual renegotiation. They argued and found that the willingness or the ability to change the governance of alliances increases with the level of governance misfit and asset specificity while it decreases when there are more contractual safeguards. Furthermore, they examined whether or not changes in the environment affect the decision to renegotiate. They did not find any effect of changes in the environment on this form of JV stability.

Bargaining Perspective. Earlier studies, which linked the internal structure of JVs to their stability, argued that ventures with a dominant partner were more stable. Absolute control makes it easier to make decisions and the potential for conflict will be reduced (Killing, 1983). However, subsequent research argued and found empirical evidence that a more equal ownership division will result in more stable JVs (e.g., Beamish and Banks, 1987; Blodgett, 1992, Hennart and Zeng, 2002). As discussed above in the section covering the formation of JVs, this stream of research sees the ownership of a JV as the result of the relative bargaining power of the partners in the negotiation process. Balanced ownership indicates partners with equal bargaining power and equal contributions to the JV, which pushes both partners to make accommodations that enhance stability. Conversely, an unequal ownership division implies that one partner has made a larger contribution to the venture and has more bargaining power than the other party, which it can use to dictate terms, leading to more negotiations and changes (Blodgett, 1992).

Some studies have taken a more dynamic perspective by focusing on shifts in bargaining power (e.g., Inkpen and Beamish, 1997). Such shifts can be the consequence of learning or changes in the environment (Hamel, 1991). Hamel (1991) and Inkpen and Beamish (1997) argued that learning is the more important determinant of changes in relative bargaining power and JV instability. Hence, there is an overlap between this dynamic bargaining perspective and the view of JVs as learning races (which we discuss below) in that as knowledge is acquired from the partner, the dependence of one party on the other is reduced and the likelihood that the JV is terminated increases. Yan and Gray (1994) found that changes in the environment, such as policy changes introduced by local governments, also lead to changes in relative bargaining power between the partners and thereby trigger changes in the structure of the venture.

Learning Theory. Kogut (1988) argued that JVs are vehicles to learn and transfer knowledge. Subsequently, learning from past collaborative ventures and learning within collaborative ventures will have an impact on their stability. The literature includes studies that stipulate three very different learning purposes, and thereby different links between learning and stability: learning about partnering, learning from the partner, and learning about the partner.

Firstly, several studies have examined the effect of *prior experience* on the survival of JVs. However, different scholars have put forward opposing effects of prior experience on JV survival. On the one hand, several scholars have argued that prior experience will lead to more stable JVs. For instance, Barkema, Bell and Pennings (1996) and Barkema and Vermeulen (1997) found that the cultural barriers associated with starting a venture abroad are reduced as a result of learning from prior experiences abroad, which increases the survival of foreign collaborative ventures. Furthermore, Pangarkar (2003) argued and found evidence that collaborative ventures will last longer if both partners have prior experience because firms learn to manage alliances and generate synergies through the pooling of resources. On the other hand, some researchers have argued that prior experience would lead to more unstable JVs. Blodgett (1992) found that prior experience in the renegotiation of ownership terms would lead to more unstable JVs because partners learn to make similar changes in the future. Reuer, Zollo and Singh (2002) integrated these two opposing effects on the stability of JVs. They argued that experienced firms should be able to design the JVs more effectively ex ante, which increases JV stability; while prior experience also creates a capability to effectively modify the alliance's governance structure, which decreases JV stability. By discriminating between different types of experiences in which different effects dominate, they found support for their arguments. The corresponding form of instability is a change in the terms and equity shares in the JV.

Secondly, a few studies have examined the competitive learning dynamics of partners within JVs. Firms may enter into a JV with the aim of learning and internalizing the skills of its partner. In that case, collaborative ventures can be seen as a transitional device in which partners race or compete to learn and acquire each other's resources, competencies and skills. As soon as one partner has achieved its goal, the race is over and the JV will be terminated (Hamel, 1991). Thus, the timing of the termination of the JV will be a function of the pace of learning, which is endogenous to the partners' actions according to Hamel (1991). Furthermore, the termination of JVs will be the likely outcome observed, and such termination represents a success for at least one partner from this perspective. However, the prevalence of such strategies is in question. Hennart, Roehl and Zietlow (1999) failed to find support for the associated prediction that firms – specifically the Japanese firms discussed by Hamel (1991) – use JVs as temporary "Trojan horses" at the expense of their partners. Because of the importance of relation-specific skills and routines, stability in interfirm cooperation is in fact normally a precondition both for partner expansion and for knowledge sharing among partners, and these in turn reinforce the stability of interfirm relations (Martin, Swaminathan and Mitchell, 1998; Kotabe, Martin and Domoto, 2003).

Thirdly, making use of learning and information economics arguments, Balakrishnan and Koza (1993) argued that JVs could act as intermediate forms that enable firms to learn about possible take-over targets. A firm can use the JV as a means to collect information about the quality of its partner. Subsequently, if the partner turns out to be of bad quality the JV will be terminated. Conversely, if the partner turns out to be of good quality an acquisition will take place. Several subsequent studies have argued or found empirically that JVs can mitigate the effect of information asymmetry about a potential acquisition target (Reuer and Koza, 2000; Shen and Reuer, 2005). Thus, the corresponding form of JV instability is the

effective buyout by one partner as it acquires the other partner, and suggests potential success for both partners.

Conclusion

In this section, we compared the literature used to explain the evolution and stability of JVs (see Table 2). The TCE literature on JV stability is still small and has mainly focused on how the degree of fit between the initial conditions and the governance choice at the formation stage influences subsequent stability. Nevertheless, TCE holds promise to shed light on endogenous uncertainty too. As we have described earlier, environmental uncertainty has an interactive effect from a TCE perspective (Williamson, 1985). Namely, a change in environmental conditions will not have much of an impact unless some other characteristics of the transaction, such as a high level of asset specificity, make this change problematic. Meanwhile, RO theory points to the existence of an explicit option, depending on uncertainty, as factors affecting JV stability. Thus, TCE and RO theory do not contradict each other. However, the interaction effect between environmental changes and asset specificity has not been tested empirically in the context of JV stability. Furthermore, it would imply a realignment of ownership shares. From a RO perspective, however, equity stakes adjust asymmetrically – specifically, the holder of a call option will increase her share only if changes in the environment push the option "in the money", i.e. if the value of the partner's underlying equity share has improved beyond the threshold strike price. Therefore, we propose:

> *Proposition 1a: Ceteris Paribus, the likelihood of JV instability will increase when there is a change in the environment and there is high asset specificity.*
>
> *Proposition 1b: Ceteris Paribus, in the presence of an explicit call option, this effect will be stronger on the likelihood of a (partial) buyout (as opposed to termination),*

but only if the change in the environment pushes the JV share's value beyond the strike price.

Table 2: The Stability of Joint Ventures: A Comparison of Perspectives

Theory/Approach	Unit of Analysis	Focus (goal assumed)	Predicted Effects on JV Stability		Selected Studies*
			Exogenous Uncertainty and Change	Endogenous Uncertainty and Change	
Real Option Theory	Option, i.e. an investment sequence	Maximize return by increasing investment under positive ex-post conditions but not under negative ex-post conditions	Changes in value have direct asymmetric effects: buy out partner if option is in the money; else hold on to the option, or terminate the option (divest) if an option-based divestment threshold has been reached. Exogenous changes also determine the timing of option exercise.	No effect	Kogut (1991) Folta & Miller (2002) Miller & Folta (2002) Vassolo, Anand & Folta (2004)
Transaction Cost Economics	Transaction	Minimize the misfit between the governance arrangement and the transaction conditions	Conditional effect (close or renegotiate JV in case of misfit)	Direct and/or conditional effect (close or renegotiate JV in case of misfit)	Lu & Hébert (2005) Reuer & Ariño (2000)
Bargaining Perspective	Firm dyad (or firm-government dyad)	As power is gained or lost, exert it accordingly to maximize share of benefits from the JV (relative to the partner)	Changes in power have direct symmetric effects (the effect of a gain in power is the reverse of the effect of a loss of power).	Changes in power have direct symmetric effects (the effect of a gain in power is the reverse of the effect of a loss of power).	Blodgett (1992) Inkpen & Beamish (1997) Yan & Gray (1994)
Learning Theory	Partners	Use learning to enhance the performance of the JV or the returns from the JV to the parent	No effect	Direct effects: - Learning about allying affects JV survival and renegotiation - Learning from partner affects JV continuation - Learning about partner affects partner acquisition	Barkema, Bell & Pennings (1996) Hamel (1991) Pangarkar (2003) Reuer & Koza (2000) Reuer, Zollo & Singh (2002) Shen & Reuer (2005)

* All studies listed in the table are discussed in the text above.

The bargaining perspective has been used to predict both the initial distribution and subsequent changes in bargaining power. On the one hand, the studies looking at the initial bargaining power distribution argued that more unbalanced bargaining power, which translates in a more unequal equity division, will result in more unstable JVs. However, RO theory offers an alternative explanation for this prediction. Namely, taking a RO position will correspond to taking a smaller share in a JV with the intention to change this equity position at a later stage. Thus, a more imbalanced equity position might lead to JV instability from a RO perspective because it corresponds with one party taking an option. Furthermore, in the case of an option, the timing and conditions for a change in equity shares should correspond to specific changes in business conditions whereby the option becomes "in the money".

On the other hand, several studies argued that shifts in bargaining power would result in JV instability. Furthermore, the emphasis in these studies is on internal and endogenous factors, such as learning, which influence bargaining power. Chi and McGuire (1996) and Chi (2000) suggested that this bargaining power argument and RO theory may be complementary. Specifically, they argued that bargaining power will affect the value distribution between the parties in a changing JV, in case a strike price has to be negotiated when there is no explicit call option. Consequently, the parties in a JV would anticipate shifts in bargaining power and react by negotiating for an explicit option clause. Accordingly, the following proposition can be tested:[13]

> *Proposition 2a: Ceteris Paribus, the likelihood that a firm has an explicit call option will be higher when it expects its bargaining power to deteriorate during the life of the JV.*

[13] In accordance with the existing literature, we focus here on call options. However, a similar argument can be made for put options that give the holder the right to sell its share. The likelihood that a firm has an explicit put option should also be higher when it expects its bargaining power to deteriorate during the life of the JV.

However, when there is no explicit option in place we would expect the option holder to anticipate a loss in bargaining power by striking the option when (s)he still has a more favorable level of relative bargaining power. This way, the option holder is able to capture more value than after the shift in bargaining power. Hence, we expect the following effect of shifts in bargaining power on the timing of exercising the option:

> *Proposition 2b: Ceteris Paribus, the likelihood that the holder of an implicit call option will increase its share or buy out its JV partner is higher when the holder expects that its bargaining power will deteriorate, while such a relationship will not hold when the option holder has an explicit option clause.*

Although external factors have received less attention from a bargaining perspective, they may also play a significant role in explaining shifts in bargaining power and subsequent JV instability. Similarly, RO theory predicts that favorable changes in the environment results in option holders exercising their options. Thus, both the bargaining perspective and RO theory seem to offer similar predictions for favorable changes in the environment. However, RO theory predicts that JVs will remain stable when the changes in the environment are unfavorable until the expiry date of the option. Thus, the predictions of both views differ when it comes to changes that have a negative impact.

Beside the learning race view of JVs, the learning perspective has focused on prior experience. On the one hand, prior experience is expected to influence the ability to design alliances ex ante and the ability to restructure the alliance ex post, and thereby influence JV stability. However, this view only focuses on ability and not on the external factors that would trigger the need for ex post adjustments. Hence, this part of the learning literature on alliances does not seem to contradict or overlap with RO theory. Some studies have also explored how learning can reduce uncertainty during the life of JVs. These studies hold

promise as complements to RO theory, with RO theory shedding light on the effect of changes in exogenous uncertainty (Cuypers and Martin, 2010) while learning models focus on the impact of changes in endogenous uncertainty on JV stability.

Overall, the key feature of ROs, which distinguishes RO theory from the other theories described above, is the asymmetry in the expected effect of a negative and positive signal from the environment. Instability in the sense of one partner buying out at least a part of the other's share, will only occur after a positive signal is observed, while JVs are expected to remain stable when a negative signal is observed until the option expires. This property of ROs should be exploited, as done by Kogut (1991), to distinguish empirically between RO explanations and alternative explanations such as the bargaining perspective and learning theory. Furthermore, we showed how the bargaining perspective can contribute to our understanding of the timing of exercising options, and vice versa. Namely, changes in relative bargaining power due to asymmetric learning are likely to be a key determinant of the timing decision to strike options when no explicit option clause is present, but this effect will depend on the existence of an explicit option as well as the direction of changes in environmental conditions.

PERFORMANCE

There exist a variety of ways to assess performance in the JV literature (Anderson, 1990; Olk, 2002). Firstly, there are a number of alternative levels of analysis. The performance of the JV itself can be analyzed, or that of one specific parent, or the combined performance of all parents. Secondly, performance can be measured via several scales such as subjective evaluation and satisfaction, financial performance, or JV (or parent) survival. Thirdly, performance can be measured at different points in time, and over different time horizons. For instance, regarding financial performance, abnormal returns from event studies

capture all performance implications of an investment as they can be anticipated in a near-instantaneous measurement window, while accounting measures such as ROA capture performance as it unfolds during the selected years. Likewise, there exist a broad range of measures of performance in the RO literature, as reviewed by Reuer and Tong (2007).

Most RO studies at least implicitly assume that investment decisions made in accordance with RO predictions will lead to value creation and higher financial performance (Kumar, 2005). However, studies testing this assumption are few, particularly pertaining to JVs. Kumar (2005) provided insights into the conditions under which acquiring a venture – i.e. striking a call option – or divesting a venture enhances the value of the parent firms. Using event study methodology, he found that JVs created value when they were divested with the aim of refocusing the firm's product-market portfolio. Furthermore, the results revealed a negative relationship between the value created by both the acquirers and divesters, respectively, and the degree of technological and demand uncertainty. A similar relationship was found between the degree of rivalry in the target market and the value created by the acquirer. Contrary to RO predictions, rivalry did not seem to influence the value created by the divester. Furthermore, Kumar (2005) failed to find positive abnormal returns when a partner acquired a JV with the aim of growth and expansion in a target market, which would be predicted by RO theory.

Tong, Reuer and Peng (2008) also examined under what conditions firms capture growth option value from having JVs. Contrary to Kumar (2005) who used abnormal returns to measure option value, Tong, Reuer and Peng (2008) measured value creation at a more aggregate corporate level. Namely, they partitioned the total value of the firm into a "value of assets in place" component and a "growth option" component, as suggested by Myers (1977). Their findings revealed a positive relationship between a firm's number of JVs and its growth option value. Furthermore, they found that the number of minority JVs and the number of

non-core JVs have a greater impact on growth option value than the number of non-minority JVs and the number of core JVs, respectively. This is consistent with JVs being valuable growth options. However, they failed to find that the number of JVs in developing countries has a greater impact on growth option value than the number of JVs in developed countries.

Finally, Reuer and Leiblein (2000) focused on the value that results from using ROs to limit downside risk, rather than on the upside potential of making RO investments. This is important as Kogut (1991) argued that firms could use JVs to capture upside potential by buying out a partner when favorable news becomes available, while limiting their downside risk. However, inconsistent with this RO prediction, Reuer and Leiblein (2000) found that firms that enter into multiple JVs do not thereby reduce their downside risk. In fact, for two out of three measures of downside risk, IJVs were associated with increased risk.

In sum, although some of the above empirical findings offer support to some RO arguments, they also point out some important deviations from the predictions of the theory. Therefore, the performance implications of making RO investments should receive additional attention. Specifically, the conditions under which JVs indeed serve as growth options that enhance firm value require attention. So do the conditions under which JVs do or do not allow firms to avoid downside risk.

The conditions under which JVs serve as growth options can be studied by combining elements of Kumar's (2005) and Tong, Reuer and Peng's (2008) approaches and looking at the effect of divestments and buyouts on a firm's growth option value. The adjustment to a firm's growth option value after a divestment or buyout will depend on the conditions surrounding the JV, specifically the level of exogenous uncertainty that enhances the growth option. Accordingly, we propose:

Proposition 3a: Ceteris Paribus, divesting a JV surrounded by higher levels of exogenous uncertainty will lead to a higher reduction in a firm's growth option value than divesting a JV surrounded by lower levels of exogenous uncertainty.

Proposition 3b: Ceteris Paribus, buying out a JV surrounded by higher levels of exogenous uncertainty will lead to a higher reduction in a firm's growth option value than buying out a JV surrounded by lower levels of exogenous uncertainty.

INTEGRATING THE DIFFERENT STAGES OF JOINT VENTURES

As we have discussed earlier, one of the attractive features of RO theory is that it is a dynamic perspective that can explain each of a JV's life-cycle stages – from initial conditions, to JV terms and initial ownership, to formation, to subsequent adjustment and post-JV outcomes (sale, dissolution etc.). Ideally, such a dynamic theory requires consistency in researching sequential stages. However, some variables or relationships that have been studied at one particular stage of JVs have received far less attention (or none at all) in studies that examined other stages. In this section we aim to integrate the different JV stages from a RO perspective. We discuss each of the stages and recap the results and arguments stepwise. Based on this we develop implications and propositions for researching each subsequent stage of the JV life cycle. We start by discussing how uncertainty can predict outcomes of each of the JV's life-cycle stages and then we move through each of the later stages – explicit vs. implicit options, initial equity shares, and finally stability and adjustments – to see how each of them can explain the subsequent stages. Table 3 describes the arrangement of the resulting predictions.

Exogenous Uncertainty

One of the most prominent concepts in RO theory, uncertainty, stands to influence each of the stages in the JV life cycle. As discussed above, Cuypers and Martin (2006b, 2010)

Table 3: Integrating Research on the Different Stages of Joint Ventures

		Independent Variables			
		Exogenous Uncertainty	**Explicitness of Call Options**	**Initial Distribution of Equity among JV Partners**	**Stability of JVs**
Dependent Variables	**Explicitness of Call Options**	Proposition 4	-	-	-
	Initial Distribution of Equity among JV Partners	Cuypers & Martin (2010)	Proposition 7	-	-
	Stability of JVs	Proposition 5	Miller & Folta (2002); Folta & Miller (2002); Vassolo, Anand & Folta (2004)	Proposition 9	-
	Performance	Proposition 6	Propositions 8a and 8b	Proposition 10	Proposition 11

theorized and found empirically that exogenous uncertainty will affect the initial ownership distribution in JVs as predicted by RO theory, but endogenous uncertainty will not. Studies looking at the other stages in the JV life cycle have not explicitly contrasted the effects of two or more sources of uncertainty, nor distinguished between forms of uncertainty that resolve endogenously versus exogenously. However, the theoretical arguments of Cuypers and Martin (2006b, 2010) can be generalized. The distinction between exogenous and endogenous uncertainty stands to matter not only to different forms of ROs (Roberts and Weitzman, 1981, Adner and Levinthal, 2004a), but also across stages of JVs as analyzed from a RO perspective. Our arguments so far entail that RO logic can help explain each of other stages of the JV life cycle when uncertainty resolves exogenously, but does not operate the same way when uncertainty resolves endogenously. Accordingly, first, we expect the presence of an *explicit call option* to depend on the nature of uncertainty. Thus, we propose:

> *Proposition 4: Ceteris Paribus, the likelihood that a firm has an explicit option to acquire equity is positively related to the level of exogenous uncertainty surrounding the JV. However, from a real option perspective, we do not expect such a relationship for JVs surrounded by endogenous uncertainty.*

This does not preclude the possibility that from a transaction cost perspective, the likelihood of an explicit option increases with endogenous uncertainty because of the governance properties of such an explicit option – as suggested by Reuer and Tong (2005). In this area, then, RO and transaction cost theories are not fully reconciled.

Furthermore, we would expect the effect of the level of uncertainty on the *stability of JVs* to be consistent with conventional RO predictions when uncertainty resolves exogenously, but not when uncertainty resolves endogenously:

Proposition 5: Ceteris Paribus, a lower level of exogenous uncertainty will increase the likelihood of a buyout by the call option holder. However, from a real option perspective, we do not except such a relationship for endogenous uncertainty.

Kumar (2005) found, as predicted, that a negative relationship exists between the value created by both the acquirers and divesters, respectively, and the degree of technological and demand uncertainty. Although Kumar (2005) considered these two distinct sources of uncertainty, he did not contrast exogenous and endogenous sources of uncertainty. Following Cuypers and Martin's (2006b, 2010) arguments, we expect *performance implications* to be consistent with conventional RO predictions when uncertainty resolves exogenously, but not when uncertainty resolves endogenously. Accordingly, we propose:

Proposition 6: Ceteris Paribus, from a real option perspective, the value created for the acquirer and the divester when a JV is (partially) acquired will be negatively associated with the degree of exogenous uncertainty. However, from a real option perspective, we do not expect such a relationship for JVs surrounded by endogenous uncertainty.

Explicitness of Call Options

Having an explicit call option gives the option holder certainty over the price it will have to pay when it decides to strike the option. Conversely, when a firm does not have an explicit option contract, it will have to negotiate a price when it wants to strike the option. There will be costs as a result of bargaining, and the other party is likely to capture at least part of the value that otherwise would have fully gone to the call option holder; however, in

the meanwhile, any disincentive to effort by the party not holding the explicit option may be reduced (Chi and McGuire, 1996, Chi, 2000).

With respect to *initial JV equity shares*, this implies that having an explicit call option clause ex ante will make the option more valuable relative to not having such a clause, because the option holder will be able to capture all residual value (see also Reuer and Tong (2005)); while the option holder may concede more initial ownership to the other party in order to obtain the call option (Chi and McGuire, 1996). In this case, the two effects work in the same direction, and an investor who takes an explicit RO position in a JV is likely to have a smaller initial equity share. Hence, we expect:

Proposition 7: Ceteris Paribus, if a firm holds an explicit call option, it will take a smaller share in the JV than when it only has an implicit call option.

However, there is a complication in that the presence of an explicit option clause seems to be determined by the same factor, i.e. exogenous uncertainty, as the initial ownership distribution (Reuer and Tong, 2005). The presence of an explicit option clause may also act as a mediator because exogenous uncertainty influences the ownership distribution. Therefore, it would be interesting to decompose the total effect of exogenous uncertainty on ownership distribution into an indirect effect through the presence of an explicit option and a direct effect, and evaluate which effect is more important. A similar effort would also prove insightful for other stages of the JV life cycle as exogenous uncertainty influences each of them.

The RO literature on *JV stability* has already largely incorporated the effects of explicit call option clauses. As discussed above, Miller and Folta (2002) argued that an explicit option clause accelerates the timing of striking options. Furthermore, Folta and Miller (2002) and Vassolo, Anand and Folta (2004) controlled for the presence of explicit option

clauses. However, both studies found that the presence of an explicit option clause decreases the likelihood of the option holder striking the option. Thus, the empirical results contradict Miller and Folta's (2002) prediction. This indicates a need for further research.

With respect to the *performance* implications of striking an option, the presence of an explicit call option is also relevant. As mentioned earlier, in the presence of an explicit call option the option holder will capture all value while in the absence of such a clause, the value is likely to be divided between the acquirer and divester. Hence, we expect:

Proposition 8a: Ceteris Paribus, if the acquirer of a JV share held an explicit call option initially, the abnormal return for the acquiring party will be positive while the abnormal return for the divesting party will not differ from zero.

Proposition 8b: Ceteris Paribus, if the acquirer holds only an implicit call option, the abnormal returns for the acquiring and divesting parties will both be positive.

Initial Joint Venture Equity Shares

Investors who are aiming to make an option investment will take a smaller share in the JV because the payoff of the option increases as the stake of the investor in the JV decreases. Conversely, investors will take a larger share if they aim to capture the static NPV part (Chi and McGuire, 1996). Thus, a different ownership stake will indicate a different type of investment.

Regarding the *stability of JVs*, we would expect RO investments to be associated with higher levels of instability than more static investments in the NPV part. Given that both types of investments are associated with taking different levels of equity in a JV, the equity distribution should be a predictor of JV stability. Therefore, we propose the following, which to our knowledge has not been tested in RO research:

Proposition 9: Ceteris Paribus, the likelihood that a firm will (partially) buy out its partner after receiving a positive signal will be higher when it has a smaller initial stake in the JV.

The *performance* implications of having different levels of ownership have not been studied empirically, although Chi and McGuire (1996) developed a model whereby the payoff of striking the option increases as the initial stake of the investor in the JV decreases, because the investor has a greater range of additional in-the-money equity to invest in. Assuming that this relationship holds, we would expect the following:

Proposition 10: Ceteris Paribus, an acquirer that held a smaller share will have a higher abnormal return when it (partially) buys out its partner.

Stability of Joint Ventures

Tong, Reuer and Peng (2008) found a positive relationship between a firm's number of JVs and its growth option value. However, they did not study the effects of instability of the JVs in a firm's option portfolio on the firm's growth option value. Any adjustment in the number of options, should lead to a corresponding adjustment in growth option value. Three kinds of adjustments can be made: (1) terminating a JV, (2) fully buying out a JV, or (3) partially buying out a JV. All three should reduce the growth option value. However, the latter case should reduce growth option value less as it does not fully abandon or strike the option as in the first two scenarios because it leaves the possibility to acquire an additional stake in the future. Accordingly, we predict:

Proposition 11: Ceteris Paribus, the termination of a JV, the full buyout of a JV and the partial buyout all reduce the growth option value of a firm. However, this reduction will be smaller in the case of a partial buyout.

Conclusion

In this section, we compared the literature used to explain the different JV stages and discuss how each stage can predict outcomes at subsequent stages (see Table 3). We contributed to the literature by identifying a number of important research opportunities resulting from the current lack of integration between these different stages. We offered a number of predictions and suggestions towards a better integration within the RO literature on JVs.

Furthermore, the lack of integration between the different stages raises a number of empirical issues. Firstly, there are several potential sources of omitted-variable bias when a determinant of one JV stage is ignored in studying subsequent stages. For instance, exogenous uncertainty affects both the ownership structure of JVs (Folta, 1998; Cuypers and Martin, 2010) and the stability of equity partnerships (Folta and Miller, 2002). Furthermore, we have argued that the ownership structure will also have an effect on the stability of JVs from a RO perspective. However, to the best of our knowledge, none of the JV stability studies from an RO perspective has controlled for the initial ownership distribution. By integrating the different stages in the RO process, and based on the propositions in this section, we aim to clearly indicate which factors should be controlled for in each of the different stages.

Secondly, a possible endogenous-selection bias arises when the different stages are not sufficiently integrated. Firms make RO investment choices based on environment conditions. Hence, their investment decisions are self-selected and endogenous (Shaver,

1998). However, studies of the performance implications of RO investments do not incorporate several of the factors that determine the initial RO investment choice. The conclusions drawn from these studies might be incorrect or incompletely generalizable in the presence of self-selection. We have discussed above how the conditions and decisions leading to each successive JV stage (uncertainty, explicit versus implicit options, initial equity shares, and subsequent stability) should be considered when studying the performance implications of making RO investments. This should help ensure that variable omission and self-selection do not invalidate future research.

INTEGRATING BEHAVIORAL INSIGHTS IN THE REAL OPTION LITERATURE

Objective vs. Subjective Uncertainty

Several scholars have called to study the behavioral aspects of making RO investments (e.g., Bowman and Hurry, 1993; Kogut and Kulatilaka, 1994; Li, James, Madhavan and Mahoney, 2007). Responding to this call, Miller and Shapira (2004) reported evidence of biases in decision-makers' estimations of the value of options. However, other than that paper, studies of the behavioral aspects of making RO investments remain lacking, particularly so when it comes to exploring JVs. Therefore, we aim to contribute to the existing literature by making use of behavioral decision theory to offer new insights on how managers perceive uncertainty and ROs.

While uncertainty is one of the fundamental concepts in RO theory, the way it is described in the literature does not necessarily correspond with observed practice. RO theory has its roots in finance. Therefore, it is generally (at least implicitly) assumed that investors are rational and able to specify an accurate distribution of the expected returns of an investment ex ante (Leiblein, 2003). Accordingly, uncertainty is usually conceptualized and measured as being *objective*. However, in reality managers value options based on their

subjective perceptions of uncertainty (e.g., Bowman and Hurry, 1993). Furthermore, studies have found only weak to moderate correlations between objective and perceptual measures of uncertainty (e.g., Tosi, Aldag and Storey, 1973; Boyd, Dess and Rasheed, 1993). Therefore, it is important to consider how uncertainty is perceived by decision-makers to explain more accurately how they make RO investments, and to explain observed deviations from normative RO models. In the section that follows, the decision-maker of interest would be the (potential) investor in a JV. Since the investor is usually a corporate entity, the discussion is subject to the usual caveat about generalizing from individual to group- or organization-level decisions.

Heuristics and Biases Influencing Real Option Decisions

It has long been established that managers cannot gather all possible information from their environment, due to limited attention and information processing capacities (Simon, 1955). As a result decision-makers are not able to make complete or fully accurate representations of their complex environments on which their actions are based (Simon, 1955; March and Simon, 1958). Instead, decision-makers rely on a number of heuristics, i.e. simplifying strategies or rules of thumb, to deal with complex and uncertain decision situations. Normally these heuristics are useful and effective, but sometimes they lead to severe and systematic errors that tend to be universal and predictable (Tversky and Kahneman, 1982a). Drawing on prospect theory, Miller and Shapira (2004) found evidence of systematic biases in the valuation of ROs, which they attributed to whether choices were framed as losses or gains. However, a number of other heuristics may also influence the valuation and the striking of options.[14]

[14] Although Miller and Shapira (2004) provided the respondents in their experiment with objective information about the distribution of uncertainty, they suggested that biases in the assessments of probabilities might also be relevant to the valuation of options.

Overconfidence and Control. Firstly, decision-makers tend to be *overconfident* about the judgments they make. In an experiment in which subjects were asked to set the lower and upper bounds of the expected returns of different investment alternatives, Fischhoff, Slovic and Lichtenstein (1977) showed that the range of possible outcomes of investments is systematically underestimated. Similarly, Shapira (1995) argued that decision-makers systematically ignore very low probability events, even when they could have significant consequences for the organization. Thus, only a part of the range of possible outcomes of an investment is considered. If so, decision-makers will systematically underestimate the volatility of the value of a JV. This will in turn lead to a systematic undervaluation of the corresponding option.

Secondly, decision-makers overestimate the *degree of control* they have over the outcome of their strategies. They also assume that if things do not go according to plan they can turn things around with additional effort, even if outcomes are exogenously determined in reality. Thus, decision-makers tend to see exogenous uncertainty as being endogenous (Langer and Roth, 1975; Schwenk, 1984). This will result in different investment incentives than those associated with RO logic. Based on these two arguments we propose:

Proposition 12: Ceteris Paribus, investors are prone to under-invest in real options and therefore take a larger than optimal initial share in JVs.

Anchoring. A third relevant heuristic is *anchoring*. Decision-makers revise their judgment about the value of variables that are crucial to their decisions when new information becomes available. However, these adjustments are generally not large enough. Thus, the values of the decision-variables are biased towards the decision-makers' initial values (Tversky and Kahneman, 1982a). Likewise, decision-makers' valuation of the call option in a JV during the holding period will be biased towards their initial valuation of the

option at the time of the JV formation. They will perceive uncertainty to resolve slower or to a lesser extent than it actually resolves. As a result, options will be exercised or abandoned sub-optimally. Therefore, we propose:

> *Proposition 13: Ceteris Paribus, relative to the RO ideal, investors in a call option in a JV are prone to buy out their partner too late or abandon the JV at the expiration date even if the option is "in the money" (i.e., the value of the JV exceeds the strike price).*

Availability. Fourthly, decision-makers assess the probabilities that events will occur by the ease with which occurrences of a similar nature can be thought of. This *availability* heuristic can also lead to biases. Some events seem to occur more frequently than others because they are easier to think of, even if they do not actually occur more frequently in practice (Tversky and Kahneman, 1982b). The probability of these more *available* events will be overestimated while that of *unavailable* events will be underestimated (Sherman, Cialdini, Schwartzman and Reynolds, 2002). The availability or ease with which events can be recalled will depend on a decision-maker's experience (Tversky and Kahneman, 1974). Indeed Calori, Johnson and Sarnin (1994) found empirical evidence of experience having an effect on CEOs' cognitive representations of the environment. Therefore, we expect top managers' subjective perception of uncertainty, and thereby their valuation of options, to be dependent on their prior experiences. Accordingly, we propose:

> *Proposition 14: Ceteris Paribus, the negative relationship between exogenous uncertainty and (initial) share in a JV will be influenced by the level of prior experience that makes the source(s) of uncertainty more salient to the investor.*

Role-Related Effects. Furthermore, Ireland, Hitt, Bettis and de Porras (1987) found evidence that perceived uncertainty varies across different management levels in the organization. They argued that managers at different levels of the organization would have different experiences and access to different types of information. Adner and Levinthal (2004a) argued that actors at different levels of the organization would have different perspectives and incentives influencing option investment decisions. Furthermore, managers will focus selectively on different aspects of the environment, including uncertainty, which are more relevant to their functional specialty (Dearborn and Simon, 1958). Therefore, we expect:

> *Proposition 15a: Ceteris Paribus, the negative relationship between the source(s) of exogenous uncertainty and (initial) share in a JV will be influenced by the level of the decision-maker in the organization's hierarchy.*
>
> *Proposition 15b: Ceteris Paribus, the negative relationship between the source(s) of exogenous uncertainty and (initial) share in a JV will be influenced by the functional specialty of the decision-maker.*

Besides these individual-level factors, organizational-level, institutional, and country factors may also lead to biases or challenges to make RO decisions (e.g., Hurry, Miller and Bowman, 1992; Adner, 2007). Accordingly, future research should also examine these factors. Finally, future research should also study how these systematic biases can be reduced to make more optimal RO decisions. A number of bias-reducing strategies and routines have been proposed in the literature. For instance, Janney and Dess (2004) identified guidelines such as ex ante specifying decision rules, separating the role of option-writer and option exerciser, and making use of external auditors to access exit strategies, which can be helpful to offset biases. Therefore, it would be interesting to assess whether or not firms who have such strategies and

routines in place make more optimal RO decisions, and if so what the conditions and costs of implementing such guidelines are.

Implications

To summarize, additional attention to behavioral decision theory can help to advance our understanding of how ROs are valued and managed. While Miller and Shapira (2004) focused on individuals' evaluation of possible losses and gains, we have examined biases in the assessment of uncertainty. More specifically, we identified a number of relevant heuristics and explained how they could lead to biases in the way uncertainty is perceived. These biases in turn will influence the valuation and management of options. Therefore, our insights are all the more relevant for managers aiming to make optimal RO decisions. Furthermore, we distinguished between subjective and objective uncertainty and pointed out the importance of this distinction for research.

CONCLUSION

This paper provides an extensive survey of the RO literature on JVs, which contributes to this body of work in three ways. Firstly, we reviewed the RO literature and a number of oft used alternative theories. By highlighting similarities and differences between the different theories, we have found RO theory to be complementary in most cases. However, in some instances RO theory seemed to be overlapping with or contradicting other theories at first sight. Therefore, it is important for future research to integrate these theories by investigating and refining their respective boundary conditions, both theoretically and empirically. The study of strategic alliances in general stands to gain from such efforts.

In this paper, we have also highlighted the need for integrating the different stages of the JV's life cycle. In doing so, we indicated a number of gaps and contradictions in the RO literature on JVs. We outlined several opportunities for future research by incorporating

explanatory variables in a particular stage that previously have only been used in the context of another stage. Addressing these issues empirically in future research will advance our understanding of RO theory, particularly with respect to JVs.

Finally, we have examined the behavioral aspects of making RO investments. By linking RO theory with behavioral decision-making theory, we hope to introduce additional realism in the use of ROs, especially JVs. This refinement is all the more relevant as it can inform researchers about how practitioners use or misuse ROs in practice.

Overall, we have demonstrated that RO theory is an important perspective to study JVs for researchers in strategy and practitioners, and opened avenues for further research both in combining RO research with other theories, and in integrating what we know about different JV decisions and stages. Given the promise demonstrated by RO research to date, but also the gaps and inconsistencies in existing models and results, further research on JVs from a RO perspective is well warranted. The research areas and predictions presented here should inform such research.

CHAPTER 3[1]

WHAT MAKES AND WHAT DOES NOT MAKE A REAL OPTION? A STUDY OF INTERNATIONAL JOINT VENTURES

ABSTRACT

This chapter examines the boundaries of real option logic, with an application to joint ventures (JVs). We distinguish between forms of uncertainty which are resolved endogenously versus exogenously, and theorize that only exogenous uncertainty will have the impact predicted by real option theory on investors' choices of equity shares. We theorize that macro-economic and institutional variables drive exogenous uncertainty, while choices pertaining to corporate scope and development activities are endogenous sources of uncertainty. Using a sample of 6,472 Sino-foreign JVs, we find support for our predictions. We discuss and implement proper methods to test for the existence of null effects, as is relevant here to establish the boundaries of real option theory. We draw implications for research on JVs – specifically equity shares – and real options.

[1] This chapter is the result of joint work with Xavier Martin. It will appear in 2010 in the *Journal of International Business Studies*, 41(1). Earlier versions of this project have been nominated for the Carolyn Dexter Award at the Annual Academy of Management Meeting in Atlanta, and for the Strategic Management Society's PhD Fellowship. It also appeared in the Academy of Management's Best Paper Proceedings.

INTRODUCTION

With greater international competition and the rise of emerging-market economies, multinational firms increasingly face highly uncertain foreign environments in which to do business. Accordingly, the emphasis in management and international business research has shifted towards how firms can compete and adapt in environments where they face various sources of uncertainty (e.g., Campa, 1994; Henisz and Delios, 2001; Krishnan, Martin and Noorderhaven, 2006; Martin, Swaminathan and Mitchell, 1998). This points to a need to specify conditional relationships between sources of uncertainty and a firm's expansion strategy, as a firm's strategy should be in line with the nature of the uncertainties it faces (Miller, 1992). While this may entail a variety of entry modes and other risk-handling initiatives, one that has sustained much interest among international business scholars is the use of foreign joint ventures (JVs) and related cooperative strategies (e.g., Beamish and Bank, 1987; Contractor and Lorange, 2002). Furthermore, above and beyond the choice between JVs and alternative modes or initiatives, a JV's setup, and specifically decisions about its ownership, have substantive consequences under uncertainty (e.g., Gatignon and Anderson, 1988).

Hence, uncertainty should also determine how much ownership firms seek over their foreign JVs, and how they use JVs to expand sequentially (e.g., Aharoni, 1966). In this chapter, we define JVs as equity-based collaborative arrangements whereby two or more organizations contribute resources, including equity, in a separate legal entity meant for the joint pursuit of economic goals (Gulati, 1995; Martin and Salomon, 2003a). We focus on international joint ventures (IJVs), which are subject to substantial uncertainty from exchange rate, cultural and institutional sources among others. This makes IJVs particularly suitable for our purpose. However, we believe that our arguments are also relevant for other (domestic) JVs insofar as they face various sources of uncertainty.

While numerous scholars have looked at the conditions under which JVs are more or less appropriate relative to extreme ownership solutions such as non-equity alliances or wholly-owned subsidiaries (e.g., Contractor and Lorange, 2002; Gulati, 1995; Hennart, 1988; Oxley, 1997, 1999; Pisano, 1990; Sampson, 2004), we look at the determinants of the distribution of JV ownership among partners, which is a far less studied aspect of JVs.[2] We use a real option perspective as this is highly appropriate to explain the strategies of firms in highly uncertain environments (Bowman and Hurry, 1993), and specifically JV ownership stake decisions (Chi and McGuire, 1996) and international contexts (Li, 2007).

The concept of real options has elicited considerable enthusiasm in recent years among scholars and practitioners of strategic investments, especially those investments that may encompass multiple stages subject to intervening events. Investments such as research projects, taking out patents, subcontracting, founding new businesses, expanding internationally, and entering into JVs have been classified as real options (e.g., Kester, 1981; Li, 2007; Reuer and Leiblein, 2000; Van Mieghem, 1999). The widespread use of real options logic, combined with the fact that a gap between theoretical and empirical work continues to exist in this area (Reuer, 2002), leaves open questions about the conditions under which real options logic is indeed applicable. At the same time, it is important to examine what variables are indeed suitable predictors within a real options framework, for both theoretical and empirical reasons.

Theoretically, Adner and Levinthal (2004a, 2004b) called for further attention to the boundaries for the application of real option theory to strategic decision-making. They argued that the assumptions underlying the real option model are violated if variables such as the

[2] The approaches that have been used in the few existing studies investigating the distribution of JV ownership among partners are Transaction Costs Economics (Chen, Hu and Hu, 2002; Delios and Beamish, 1999; Gatignon and Anderson, 1988), Agency Theory (Chi and Roehl, 1997; Nakamura and Yeung, 1994), and the Bargaining Perspective (Blodgett, 1991; Fagre and Wells, 1982). However, these studies have yielded mixed results regarding the role of (behavioral) uncertainty on the equity distribution of JVs. For a detailed review of this literature, see Cuypers and Martin (2007).

end-date of the underlying project are discretionary: *"Because much attention in the management literature is focused on the ways in which the firm can affect outcomes and variances […], it is important to examine what happens to the applicability of options logic as we move away from a world of wait and see to a world of "act and see," in which uncertainty resolution is endogenous to firm activity" (*Adner and Levinthal 2004a, p. 76). This question is especially relevant when applying real options logic to the study of JVs, because JVs represent both investments with implications for each participating firm's overall corporate strategy and performance, and a choice of a governance mode that itself may encourage strategic or opportunistic behavior among partners. Moreover, the literature on JVs has looked at how JVs can both be used as vehicles to "wait and see" and to "act and see". For example, Aharoni (1966) argued that JVs could be used to limit a firm's exposure to uncertainty, while other studies have looked at how firms can improve their performance through learning in JVs (e.g., Kogut, 1988; Mitchell and Singh, 1992; Mody, 1993). This makes JVs all the more suited to investigate the issues raised by Adner and Levinthal (2004a, 2004b). Whereas Adner and Levinthal (2004a, 2004b) focus on the duration of the investment and the issue of project drift, we focus on uncertainty, which is a key reason for using JVs to enter international markets (Kogut, 1991) and to make real option investments in general.

Empirically, while some studies of JVs have found support for predictions derived from real options theory, others have not. Indeed, two prominent studies, by Folta (1998) and Reuer and Leiblein (2000), found deviations from real options predictions with respect to the effect of uncertainty on JV formation and the downside-risk consequences of JVs respectively.

We aim to address the above theoretical and empirical conundrums by developing and testing hypotheses about which sources of uncertainty are indeed, or are not, associated with

JV equity shares consistent with real option theory. In so doing, we contribute to the real option literature by examining, theoretically and empirically, to what extent real option logic accurately describes equity shares in international joint ventures (IJVs). Specifically, we examine whether various forms of uncertainty predict the distribution of equity stakes in IJVs in the way that real options logic suggests, depending on whether or not the uncertainty can be resolved endogenously. We also contribute to the JV literature at large in several ways. We explicate the conditional effect of uncertainty on JV ownership, thus complementing literature about the choice of entry mode. We thus refine the analysis of uncertainty as a determinant of JV strategy. In general, our study advances the understanding of how JVs are structured under conditions of uncertainty.

BACKGROUND

Real Options

Simultaneously with the increasing popularity of financial options in the 1970s, it was realized that an analogy exists between organizational resources investments and financial options (Myers, 1977). Bowman and Hurry (1993) argued that the option lens can be very useful to study the strategies of organizations, since the capabilities and assets of an organization can be seen as a bundle of options for future strategic choices. These options are called "real options" and can be defined as contingent investment commitments in an asset or capability, rather than in a financial contract, which secure decision-making rights in the future (Trigeorgis, 1993).

Numerous insights and techniques from financial option pricing have spilled over to the valuation of organizational resources investments. Prominently, they imply that the traditional Net Present Value (NPV) approach to value investments does not fully capture the value of management's flexibility to adapt to unexpected market developments. Such flexibility can increase the investment's upside potential while limiting its downside losses

relative to management's initial expectations under passive management (Trigeorgis, 1995). This does not mean that the traditional NPV approach to valuing investments should be put aside, but instead that it should be extended to take into account both a passive NPV component and a dynamic option value component (Pindyck, 1988). The value of the real option component of an investment is a function of the same parameters that determine the value of a financial option (Seth and Kim, 2001).

However, not every investment or decision is an investment in real options. The two different value components can be captured in a different way because they require a different size of investment. On the one hand, the passive NPV component requires a large investment in order to capture as much cash flow as possible. On the other hand, the dynamic option component can be captured with a smaller investment. This distinction can be applied to JVs too.

Joint Ventures and the Option to Acquire

Kogut (1991) was the first to apply real option theory to IJVs. He argued that firms can capture the upside potential of a JV by buying out the partner in a later stage when favorable information becomes available. At the same time, taking a lower share in the JV limits the downside risk. The option to acquire can be explicit, but this is not a necessity. Even when there is no ex ante contractual specification of which party holds the acquisition right and of the strike price, it remains possible for both parties to negotiate the acquisition of the other party's share at a price that is agreed upon later under specific conditions. Hence, JVs have at least an embedded implicit call option to acquire a partner's stake (Chi and Seth, 2001).

Following Kogut (1991), several other scholars have looked at JVs from a real options perspective (e.g., Chi and McGuire, 1996; Chi and Seth, 2001; Reuer, 2000, 2002; Reuer and Koza, 2000; Reuer and Leiblein, 2000; Reuer and Tong, 2005). One of the key findings is

that the options embedded in JVs will have an impact on the distribution of the equity stakes. On the one hand, if the investor tries to capture the static NPV part (s)he will take an as large as possible share, to fully capture the future cash flows. In the extreme, this will lead to an acquisition instead of a JV (Seth and Kim, 2001). On the other hand, an investor who aims to capture the dynamic real option part will invest in a smaller share of the JV because this limits the downside risk while leaving open the opportunity to capture the upside potential of the JV (see Chi and McGuire, 1996; Reuer, 2002). Thus a JV contains an implicit or explicit call to acquire the other party's stake, and we can expect the firm investing in the call option to take a smaller share in a JV.

Real Option Theory and Uncertainty

One of the most prominent concepts in real option theory is uncertainty.[3] Two broad streams of research (Reuer, 2002) address JV investments (among other decisions) using the logic of real options. Although the general premise in both streams is that uncertainty in general is positively related to option value (e.g., Bowman and Hurry, 1993; Kulatilaka and Perotti, 1998), the two streams provide different but complementary insights into the role of uncertainty.

In the first stream, researchers use formal models to study the theoretical benefits and cost of investing in different kinds of strategic real options and to assess how flexibility can contribute to value creation. Many of these models focused on one or at most two different sources of uncertainty each. For instance, Bell (1995) and Huchzermeier and Cohen (1996) focused on exchange rate uncertainty. Bollen (1999) looked at demand uncertainty. Chi and McGuire (1996) and Chi (2000) examined how uncertainty about the market and about a collaborative partner can add to the value of collaborative ventures. Additionally, some

[3] The concept of uncertainty used in option theory is actually one of risk in the sense of Knight (1921), in that options pricing models assume that it is possible to specify the probability distribution of future asset values. Nevertheless, we follow the extant use of terminology in referring to this as "uncertainty".

scholars have emphasized that real option reasoning applies to uncertainty that is exogenous, i.e. outside the control of the firm (e.g., Kulatilaka, 1995). Indeed, Miller and Folta (2002) argued that such exogenous uncertainty increases the value of a call option, unlike uncertainty that is under the control of the firm (e.g., responding to rivals' threat of pre-emption).

In the second stream, researchers examine empirically whether JV decisions are consistent with real options theory. Kogut (1991) found evidence of JVs being used as options to make subsequent acquisitions in the presence of market uncertainty. Folta and Miller (2002) looked at the timing of exercising options and found evidence of the influence of uncertainty, operationalized as the variability in stock-market subfield indices, on the timing of partner buyouts in equity partnerships in the biotechnology industry. Reuer and Tong (2005) found that the likelihood that a firm will have an explicit option to acquire equity in an IJV is a function of property rights uncertainty, political uncertainty and diversification-related uncertainty but not of cultural distance. However, other studies found results inconsistent with real options predictions. Reuer and Leiblein (2000) found that firms that enter into multiple JVs do not thereby reduce their downside risk; in fact, for two of three measures of downside risk, IJVs were associated with increased risk. Folta (1998) found that multiple forms of uncertainty were associated with the taking of real option positions in the form of minority equity investments (rather than acquisitions). However, only exogenous uncertainty associated with subfield-specific stock market volatility encouraged the formation of JVs as call options.

In summary, multiple sources and concepts of uncertainty have been advanced in real options research; however, very few studies have contrasted the effects of two or more sources of uncertainty. Furthermore, differences in concepts of uncertainty may explain some of the deviations from the general uncertainty-option value relationship which have been

found in the empirical literature with respect to JVs. To address this, we seek to contrast multiple sources of uncertainty. In this respect, the gaps between theoretical and empirical literatures suggest that a critical distinction is whether or not uncertainty is exogenous to the firm's influence.

HYPOTHESES

The decision to invest in a call option to acquire will depend on the value of that option. This call option value will increase as uncertainty surrounding the value of the underlying asset increases. As the distribution of the possible values of the underlying asset at maturity widens, it becomes more probable that the option will be in-the-money at maturity, making the exercise of the call profitable. Conversely, the downside if the option is out-of-the-money does not increase – it is just the initial cost of the option. Once a firm acquires a real option on a future opportunity, it can strike the option and take the full opportunity if the uncertainty is resolved favorably over time, or just let the opportunity pass at no further cost if the uncertainty is resolved unfavorably.

Carrying over this insight from financial options to real options is what makes real option theory particularly appealing: It deals with one of firms' most important challenges by linking current strategic decisions with uncertainty about future outcomes. However, the carry-over is problematic if the conditions for the resolution of the uncertainty depart from the theory (Adner and Levinthal, 2004a). In this respect, two forms of uncertainty can be distinguished: exogenous uncertainty and endogenous uncertainty (Folta, 1998; Roberts and Weitzman, 1981).

Exogenous uncertainty is uncertainty of which the resolution is unaffected by the actions of the firm (Chi and Seth, 2001; Roberts and Weitzman, 1981). For example, uncertainty about currency exchange rates is exogenous since these rates are determined in atomistic markets that cannot be outguessed or manipulated (Campa, 1994). By contrast,

endogenous uncertainty is resolved (at least in part) by the actions of the firm itself over time. More specifically, the degree, direction and pace of resolution of endogenous uncertainty depend both on the effort of the firm to obtain more information and on the actions it undertakes accordingly to influence outcomes (Chi and Seth, 2001; Roberts and Weitzman, 1981). For instance, a firm may not know *a priori* how hierarchically structured the organizations in a given country may be, but that uncertainty can be resolved by making a systematic effort to learn about the issue and by adjusting the investor's own behavior and that of its business partners accordingly (Hofstede, 2001).

We argue that while real options theory should apply in the case of exogenous uncertainty resolution, it need not when uncertainty resolution is endogenous. The case of exogenous uncertainty corresponds to the case of financial options, where it is assumed that uncertainty is resolved independently of the investor's behavior. If this property carries over to investments that are non-financial in nature, the real option logic should hold (Adner and Levinthal, 2004a). Furthermore, Dixit and Pindyck (1994) argue that exogenous uncertainty increases the value of waiting for new information[4] and makes committing resources less attractive because investing will not influence how uncertainty is resolved. Hence, options pricing models should be applicable.

Conversely, when uncertainty is resolved endogenously, three separate but related arguments can be made whereby real option logic will not hold anymore. Firstly, in case of financial options, investors are assumed to be price-takers (Black and Scholes, 1973; Jarrow and Turnbull, 2000). This is reflected in the use of the Brownian (random) motion to model the price of the underlying asset. However, when investors can influence the resolution of

[4] In case of exogenous uncertainty the firm will wait for information about how the exogenous source of uncertainty has evolved and subsequently take action, i.e. decide whether to strike, hold-on to or abandon the option. In a broad sense this can also be seen as learning. However, contrary to learning in case of endogenously resolved uncertainty, the firm cannot determine the pace of information revelation, nor can it influence its outcomes. "Learning" amidst exogenous uncertainty thus simply represents the passive receipt of updated information. It does not represent the systematic, forward-looking accumulation of experience or the proactive development of causal insight that is normally associated with organizational learning (Fiol and Lyles, 1985).

uncertainty through their own actions, they are not pure price-takers anymore; instead, they can affect the value of the underlying asset. This violates a fundamental assumption of (financial) option pricing models (Black and Scholes, 1973; Merton, 1973). The resulting arbitrage opportunities mean that existing models will fail to price options accurately (Jarrow and Turnbull, 2000).

Secondly, uncertainty that can be resolved endogenously influences the investment decision differently than uncertainty that is resolved exogenously. Endogenous uncertainty can be resolved by undertaking efforts to discover how to manipulate the outcome of interest and then by acting accordingly, i.e. by proactive investment (Dixit and Pindyck, 1994; see also Kulatilaka and Perotti, 1998). In such a situation, the issue becomes one of figuring out the means and cost to resolve uncertainty rather than of uncertainty about the payoffs of the project proper. According to Dixit and Pindyck (1994), only investing will reveal the relevant information and allow the corresponding solution to be implemented. Therefore, there exists an incentive to invest and commit resources rather than wait. Hence, the normal real option logic will not apply in case of endogenous uncertainty. As Dixit and Pindyck (1994) noted, this does not exclude that investments surrounded by endogenous uncertainty occur sequentially, thereby superficially resembling real option investments when in fact their resolution depends on a different mechanism (the NPV component).

Thirdly, Adner and Levinthal (2004a) argued that the validity of real options theory as a decision-making tool is likely to break down if uncertainty can be resolved endogenously and targets are flexible. Acting to reduce endogenous uncertainty will often lead to the discovery of new and unanticipated opportunities and paths. Thus, actions will not only reduce the uncertainty surrounding the initially intended project but it will also provide information about other possibilities and introduce new goals, even when the outcomes are negative from the perspective of the initial project and its goals. As a consequence of the

open-ended nature of this discovery process, the discrete nature of real options investment is eroded, which creates serious organizational challenges to preserve the specific form of flexibility that made a real option investment attractive in the first place.

For these reasons, we expect that while real options predictions will accurately describe firms' responses to exogenous uncertainty, they will not accurately describe their responses to endogenous uncertainty. To explicate this difference further, we derive six hypotheses, of which three deal with sources of uncertainty that are resolved exogenously and three with sources of uncertainty that are resolved endogenously.

Exogenously Resolved Uncertainty

Economic uncertainty: An important host country factor that has an impact on the value of an investment is economic uncertainty (e.g., Anderson and Gatignon, 1986). This refers to the uncertainty about the macroeconomic situation in a host country and encompasses all the unknowns about the level of economic activity and prices (Oxelheim and Wihlborg, 1987). More economic uncertainty results in higher variability in both the foreign investor's cash flows and the value of the investment (Anderson and Gatignon, 1986). As a result, the value of a call option will increase as economic uncertainty increases.[5]

Key macroeconomic variables such as inflation, prices and aggregate demand are determined in a complex system consisting of markets and sovereign governments (Oxelheim and Wihlborg, 1991). Thus, for individual firms it is extremely difficult, if not outright impossible in larger economies, to influence the macroeconomic conditions of the host country. Therefore, economic uncertainty will be resolved exogenously. Accordingly, we expect real option logic to hold:

[5] For simplicity of exposition, we treat the foreign partner as the call option holder. This is consistent with the existing literature (e.g., Reuer and Tong, 2005). We will discuss why this assumption is all the more valid in our empirical setting, i.e. China, when we describe our sample below. In some other empirical settings it may be less clear who is the call option holder.

Hypothesis 1: *Ceteris paribus, a foreign partner entering into a joint venture in an environment with higher economic uncertainty will have a higher propensity to make a call option investment. Therefore, the foreign partner will take a smaller share in the joint venture.*

Local institutional uncertainty: The institutional environment includes legal, regulatory and social factors that shape business activity (Davis, North and Smorodin, 1971). These institutions can cause uncertainty for investors in various ways. For instance, in an underdeveloped judicial system, laws tend to be unclear or inadequate, and their enforcement unreliable. Investors are thus uncertain about current and future tax obligations, labor laws and the neutrality of courts. Generally, an unstable (local) institutional framework increases ongoing uncertainty for business owners (Davis, North and Smorodin, 1971). Such uncertainty is bound to affect foreign investors, including JVs (Shan, 1991).

Furthermore, institutional uncertainty is resolved exogenously, especially in larger and more complex national systems, because a firm is unlikely to be able to affect the multiple layers of government and institutions that make such policies, even if it manages to understand them (e.g., Chi and Seth, 2001). Accordingly, we hypothesize:

Hypothesis 2: Ceteris paribus, a foreign partner entering into a joint venture located in an area with higher institutional uncertainty within a country will have a higher propensity to make a call option investment. Therefore, the foreign partner will take a smaller share in the joint venture.

Exchange rate uncertainty: Expanding abroad usually also commonly means that a firm has to deal with a currency other than their home country's currency. Changes in the

exchange rate will in turn influence the value of the foreign investment. This source of uncertainty is inherent in international business, regardless of whether the exchange rate is fixed (and thus subject to unpredictable adjustment) or floating (Katz, 1972; Miller, 1992).

It has been well established that the private prediction of future exchange rates, is costly and unreliable – i.e., investors cannot reliably predict the direction of exchange rates, beyond information provided in currency markets. Furthermore, individual firms are price-takers on the foreign exchange markets. Foreign exchange markets are too large in volume and too liquid for individual non-financial companies to influence exchange rates (Campa, 1994; Eiteman, Stonehill and Moffett, 1998). Hence, exchange rate uncertainty is resolved exogenously. Accordingly, we hypothesize:

> *Hypothesis 3: Ceteris paribus, a foreign partner entering into a joint venture in an environment with higher exchange rate uncertainty will have a higher propensity to make a call option investment. Therefore, the foreign partner will take a smaller share in the joint venture.*

Endogenously Resolved Uncertainty

Cultural uncertainty: When an organization expands abroad it will be confronted with an environment that is culturally different from that in its home country. The success of the foreign venture will depend on the cooperation and communication with local parties who tend to have different values, beliefs, and customs (Hofstede, 2001). A lack of knowledge of the local culture can have serious negative effects on the investment (Barkema, Bell and Pennings, 1996). The more distance between the culture of the foreign investor and the culture of the host country, the more uncertainty there will be in this respect. The foreign partner will be unsure of how well it communicates with local employees, suppliers and

customers as is necessary to succeed in its new environment. The more distant the cultures, the less certain it becomes that the essential skills and knowledge can be effectively acquired. Thus, initial uncertainty also exists about the conditions for operating successfully across cultural boundaries in the new environment. Furthermore, as cultural distance increases, it becomes more uncertain how the parties (owners) to a JV will interact with each other. With increased cultural distance the partners face increased communication problems among themselves, are more likely to have different goals, are more likely to have a more negative attitude towards each other, and experience more stress (Weber, Shenkar and Raveh, 1996). Uncertainty about the JV's performance increases accordingly.

While such cultural differences indeed represent a severe source of uncertainty for the firm initiating expansion abroad, this uncertainty can be resolved by the actions of the firm itself. With local experience, a foreign investor can much better assess cultural predilections in the host country. It can then assess better how its own personnel and organization should interface with local parties, and adjust its behavior to conform to local culture as relevant (Black, Mendenhall and Oddou, 1991). The foreign investor can also use this information to bargain with the JV partner(s), local employees, suppliers and customers, etc. – parties whose behavior it may effectively influence, unlike macro-institutions. Such informed adjustments to the behavior of the foreign firm, and plausibly its business partners, will influence the outcome of the JV and thereby the value of the asset underlying the option. Furthermore, the firm can decide how to invest in learning about the local culture and values and how to act proactively based on this (Black and Mendenhall, 1990). Thus, unlike the exogenous uncertainty described in our first three hypotheses, cultural uncertainty can be resolved endogenously. This entails a departure from the assumptions underlying real option logic. Therefore, we do not expect cultural uncertainty to determine the value of a call option. Hence, we hypothesize:

Hypothesis 4: Ceteris paribus, a foreign partner originating from a more culturally distant country will not have a higher propensity to make a call option investment when entering into a joint venture. Therefore, the foreign partner will not take a smaller share in the joint venture.

Uncertainty about development capabilities: In case of JVs an important source of uncertainty pertains to corporate capabilities (Chi and Seth, 2001). Firstly, there is uncertainty about the stand-alone capabilities of the other party, due to information asymmetry. Secondly, there is uncertainty about the potential benefits of combining the assets contributed by each partner. This uncertainty is especially important when it comes to intangible assets and knowledge-based activities (Martin and Salomon, 2003a; Seth and Kim, 2001).

Such uncertainty about capabilities is most prevalent in collaborations that involve product and/or process development activities. Development projects generally require a substantial amount of specific know-how and proprietary information (Chan, Kensinger, Keown and Martin, 1997). Furthermore, in JVs that encompass development activities, this specific know-how and information must be shared in order to enable joint discovery, search for new solutions and accomplish product or process development goals. This entails higher uncertainty than in JVs that limit themselves to the use of existing know-how (Pisano, 1989). Therefore, we expect uncertainty about partner capabilities to be higher in JVs with development activities.

However, over time the foreign partner will become better able to assess the development contributions of the local partner (Chi and Seth, 2001). Information asymmetry about the stand-alone capabilities of the partner will be reduced too (Balakrishnan and Koza,

1993). This will start to reduce the uncertainty about the benefits of combining assets (Seth and Kim, 2001). Furthermore, the pace and extent to which this uncertainty is resolved will depend on how much effort the foreign investor allocates to acquiring and implementing knowledge in the development process (e.g., Cohen and Levinthal, 1990; Mowery, Oxley and Silverman, 1996). As a result, the foreign partner will be able to take a number of actions to increase the likelihood that the development activities are successful. Hence, resolution of this kind of uncertainty is endogenous to the foreign partner's actions (Chi, 2000; Chi and Seth, 2001; Dixit and Pindyck, 1994; Mowery, Oxley and Silverman, 1996). Therefore, we do not expect the normal real option effect to hold. Rather, we predict:

> *Hypothesis 5: Ceteris paribus, a foreign partner entering into a joint venture with a product or process development purpose will not have a higher propensity to make a call option investment. Therefore, the foreign partner will not take a smaller share in the joint venture.*

Scope-related uncertainty: JVs differ in their scope, i.e. the extent to which their partners combine functions and activities within the JV (Oxley and Sampson, 2004). For example, JVs can perform manufacturing, marketing, R&D, service activities or any combinations of these. An increase in the scope of a JV increases the interdependence, complexity and uncertainty of collaborating (Oxley and Sampson, 2004; Reuer, Zollo and Singh, 2002). Thus, we expect uncertainty to be higher in JVs with a broader scope.

However, the JV partners can choose to increase the level of communication and coordination to deal with the increased uncertainty resulting from a broader scope (e.g., Kogut, 1988). Furthermore, they can learn about each other's skills, procedures and capabilities and create idiosyncratic skills to collaborate, which enable them to deal more

successfully with unanticipated contingencies (Nakamura, Shaver and Yeung, 1996; Pisano, 1989). As a consequence, the uncertainty resulting from a broader scope can be addressed by the actions of the partners in the JV. Therefore, scope-related uncertainty is endogenous and we do not expect a real option effect. Accordingly, we hypothesize:

> *Hypothesis 6: Ceteris paribus, a foreign partner entering into a joint venture with a wider scope of activities will not have a higher propensity to make a call option investment. Therefore, the foreign partner will not take a smaller share in the joint venture.*

RESEARCH DESIGN

Sample

We collected data on equity JVs (JVs) formed in China between 1979 and 1996 and involving a foreign partner. The main source of data is the Almanac of Foreign Economic Relations and Trade of China, which is published by the Chinese Ministry of Foreign Trade and Economic Cooperation (MOFTEC).[6] The data source listed 8,077 Sino-foreign JVs. However, the number of observations was reduced to 6,472, originating from forty-one countries, once we excluded tri-partite JVs for which each party's equity investment could not be broken down, and countries for which Hofstede's (2001) cultural scores were not available. These JVs are newly established legal entities in which both partners contribute resources, including equity. Moreover, the JVs in our sample are active in 59 different industries and cover China's entire geographical area.

The data have been shown to be reliable and consistent with FDI data from independent non-Chinese sources and parts of the data have been used in several published

[6] MOFTEC was formerly known as the Ministry of Foreign Economic Relations and Trade (MOFERT) and currently known as the Ministry of Commerce of the People's Republic of China (MOFCOM).

studies (e.g., Chadee and Qiu, 2001; Chadee, Qui and Rose, 2003; Pan, 1996; Pan, 2002).[7] Furthermore, our sample is comparable to those used in other published studies of JVs in China which used other sources such as from the China Business Review (e.g., Gaba, Pan and Ungson, 2002; Tse, Pan and Au, 1997). Hence, we feel our sample is consistent with those used in other studies and representative of all JVs established in China between 1979 and 1996.

China and our JV data are particularly suited to test our hypotheses, for several reasons. Firstly, China was the world's second largest recipient of FDI after the U.S. as of 1994 – indeed it surpassed the U.S. in 2003 (UNCTAD, 2003). This provides a large number of observations originating from a wide range of countries. Secondly, China is a complex environment for foreign investors, where each of the sources of uncertainty described in our hypotheses is substantial (Boisot and Child, 1999). Thirdly, almost all foreign investment in China during the study period was through JVs. China's government actively sought to promote equity-based JVs while preventing other modes of investment.[8] This makes the data all the more complete.

The question arises, naturally, whether these JVs are indeed real options. Theoretically, numerous scholars have argued that JVs are real options (e.g., Chi, 2000; Chi and McGuire, 1996; Kogut, 1991; Miller and Folta, 2002; Reuer and Tong, 2005). Furthermore, there is strong and corroborating empirical evidence supporting JVs as real options. More specifically, there is evidence pertaining to the presence of explicit options in JVs (Reuer and Tong, 2005), the formation of JVs (Folta, 1998), the stability of JVs (Folta

[7] Pan (2002) also looks at JVs established between 1979 and 1996. Other studies use a subset of our sample. Pan's (1996) sample covers the 1979-1992 period; Chadee and Qui (2001) look at 1992-1995; and Chadee, Qui and Rose (2003) study JVs established between 1984 and 1996.

[8] Deng Xiaoping's reforms were summed up in the "Four Modernizations" of agriculture, industry, science and technology and the military. The focus was on knowledge transfer from the West. The C.C.P.'s initial view was that this could best be achieved by setting up joint ventures with foreign partners. Therefore, all alternative investment modes were prohibited except for a few exceptions (Almanac of Foreign Economic Relations and Trade of China, various issues).

and Miller, 2002; Kogut, 1991; Vassolo, Anand and Folta, 2004), and the performance implications of making JV investments (Kumar, 2005; Tong, Reuer and Peng, 2008), which are all consistent with real option predictions.

In the specific case of China there are four additional reasons to think these JVs contain real options. Firstly, Reuer and Tong (2005) argued that JVs are even more likely to be real options under high levels of uncertainty.

Secondly, we conducted a number of interviews with managers of multinational firms that are active in China. These interviews consistently revealed that firms take a real option approach when they enter China. For example, one manager in charge of a large electronics firm's JVs stated that: "*we use a real option approach to structure our investments when we enter China because it is such an unpredictable market*". Other managers gave similar responses.

Thirdly, by Chinese law, the articles of association of Sino-foreign JVs must include a pricing mechanism to determine the value of the JV at dissolution or for other changes of ownership. Furthermore, the contractual duration of a JV has to be specified ex ante in the JV's articles of association. Therefore, JVs in China correspond at least with what Seth and Chi (2002) classify as an option with a restrictive termination clause and a pre-specified mechanism to value the JV. This kind of JV specification is a stronger and more explicit type of real option than purely implicit options, and it comes close to the strongest form of real options in which the strike price is exactly specified ex ante. Furthermore, we can say with confidence that the foreign parties in Sino-foreign JVs will only hold a call option, and no put option. That is because China's legislation and the policy of the ruling Chinese Communist Party (C.C.P.) hampered foreigners from exiting by selling their equity to their venture partner. Likewise, the Chinese JV partner did not hold a call option but a put option. In

addition, the secondary market for JVs stakes among foreign investors in China was highly regulated, and almost non-existent in practice.[9]

Fourthly, to confirm this we conducted a quantitative analysis of all the stock listed companies in our sample which showed that most of the JVs remained stable over their ex ante specified life. This is consistent with real option predictions in that options are usually held until maturity because of the time value of the option. Furthermore, when we saw changes in the ownership distribution of JVs, they consisted of the foreign partner buying out some or all of the Chinese party's equity. This again is consistent with the JVs as being real options where the foreign partner holds a call option. Moreover, there is anecdotal evidence that foreign partners use the ex ante specified pricing mechanism in the JV contract of association to value the venture when they decide to strike the call. For example, the Fortis banking group acquired an additional stake in one of its Chinese JVs without having to pay a premium over the price determined by the pre-specified pricing mechanism (Financial Times, 2005). This indicates that the Chinese party was not able to renegotiate and drive up the strike price.

All this does not preclude that the foreign partner can specify an explicit strike price when the JV is formed, making for an even stronger form of real option. Indeed, we observed a number of firms entering into a JV in China with such an explicit option. Among these foreign firms are the British bank HSBC, US IT-company 3COM, Australian telecommunication firm Telstra, and French car manufacturer PSA Peugeot Citroën. Overall, we found convincing evidence that the JVs in our sample indeed contain real options.

[9] Whatever the letter of the law, contracts may be imperfectly enforceable in the presence of weak institutions. For instance, in the context of the Brazilian telecommunication industry, Perkins, Morck, and Yeung (2008) found that local partners may use pyramidal ownership schemes and used local institutions to take advantage of foreign partners. Our fieldwork does not suggest that this is as much of an issue in China. This may partly explain why China has been so successful at attracting foreign direct investment, including Sino-foreign JVs. As Fan, Morck, Xu and Yeung (2007: 25) put it: "Ultimately, China may well provide a better institutional environment for FDI operations than for domestic operations – large or small, state controlled or privately run. If China, more than other countries, favors FDI in this way, it might well receive an elevated FDI inflow."

Dependent Variable

Foreign share: Our dependent variable is the percentage of foreign ownership in Sino-foreign JVs. As discussed earlier, a foreign investor who wants to capture the static NPV part will be more likely to take a large share while an investor who makes a call option investment will take a smaller share (Chi and McGuire, 1996; Reuer, 2002). Under Chinese law the percentage of foreign ownership could range from 25% to 99.9%.

Independent Variables

Economic uncertainty (H1): The degree of economic uncertainty is measured using the *Euromoney* country risk index. This oft-used index measures the economic uncertainty of a country at a particular time on a scale from 0 to 100 based on credit (e.g., payment records), analytical (e.g., economic performance forecasts), and market indicators (e.g., selldown performance). The index comprises a mix of market perception and objective measures.[10]

Local institutional uncertainty (H2): The Chinese government established a number of special areas over time to attract foreign investment. These areas are characterized by a lower level of uncertainty for foreign investors as a result of a higher degree of liberalization, a more developed institutional and regulatory framework, less bureaucratic red tape and less government involvement (Shan, 1991). Two types of special areas exist, which differ in location; but are otherwise similar: the *Special Economic Zones* (SEZ) and *Open Coastal Cities*. Five Special Economic Zones[11] were declared in 1980 and a number of coastal cities[12] were opened in 1984. We include a dummy variable which equals zero if the JV was located in either an SEZ or an open coastal city, indicating lower uncertainty, and one when the JV is

[10] The *Euromoney* index is only available in its current format from 1982 onwards. An alternative format, albeit with similar interpretation, was reported for the earlier years in our study period. We transformed the index for the earlier of our sample years to get consistent scores that go back to 1979. Excluding the observations from 1979 to 1981 or using alternative methods to extrapolate does not materially change our results. We opted to keep these observations to have a more complete and representative sample.

[11] Shenzhen, Zhuhai and Shantou in Guangdong Province, Xiamen in Fujian Province, and all of Hainan province.

[12] Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai.

located in any other region.[13] The same or similar variables have been used in other studies (e.g., Pan, 1996; Shan, 1991).

Exchange rate uncertainty (H3): In a fixed exchange rate regime such as China's, exchange rate uncertainty does not come from continuous daily market changes in the exchange rate but from discrete changes (i.e., devaluations or revaluations) made by the government at unpredictable intervals. However, a black market or so-called parallel exchange rate market has developed in many countries with a fixed exchange rate regime (Reinhart and Rogoff, 2004). On this parallel market the exchange rate changes continuously subject to market forces. Therefore, there will often be a difference between the fixed official exchange rate and the floating parallel market rate. These differences are an indication of the level of exchange rate uncertainty for foreign investors. The official rate will correspond to the real (economic) exchange rate when the fixed official exchange rate equals the floating parallel market rate. Thus, it will be extremely unlikely that a discrete change of the official exchange rate will take place. However, there will be increasing exchange rate uncertainty when the gap between the fixed official exchange rate and the floating parallel market rate grows. This bigger difference indicates more strain on the official exchange rate. Uncertainty increases because it is unclear how much the official rate will change and when it will change. Accordingly, following Reinhart and Rogoff (2004), we measure exchange rate uncertainty as the absolute value of the parallel market premium (or discount), measured over the previous 12 months as is common in the literature:[14]

$$\text{Parallel Market Premium} = \frac{\left|\text{Average Annual Official Rate - Average Annual Parallel Rate}\right|}{\text{Average Annual Official Rate}}$$

[13] As an alternative measure of institutional uncertainty, we used the component of the *Economic Freedom of the World* index which captures the level of uncertainty resulting from a country's institutional framework. This measure is published annually by the Fraser institute and varies over time rather than between different geographical areas within China. Our results remain robust. However, using this alternative measure resulted in moderate levels of collinearity, which is especially undesirable when testing multiple hypotheses. Therefore, we used the location-based variable described above instead.

[14] Exchange rate data are from various annual issues of the *World Currency Yearbook, Pick's Currency Yearbook* and the IMF's *Annual Report on Exchange Rate Arrangements and Exchange Restrictions.*

Thus, a higher parallel market premium (or discount) indicates more exchange rate uncertainty.[15]

Cultural uncertainty (H4): We measure cultural uncertainty by using Kogut and Singh's (1988) cultural distance index. This oft-used index is based on the difference between each country and a focal country (here, the investor's home country vs. China) along each of Hofstede's (2001) four initial cultural dimensions. A higher score on Kogut and Singh's (1988) cultural distance index implies a higher level of cultural uncertainty.

Uncertainty about development capabilities (H5): Based on the textual description of the activities of the JVs, we identify those projects that were engaged in any substantive development activities. We construct a variable that takes a value of 1 if a JV undertakes development activities, and 0 otherwise. In almost all cases, these activities pertained to product (rather than process) adaptation. While pioneering technological research may represent exogenous uncertainty when it is subject to uncontrollable external conditions – a point to which we return in the discussion – upon careful verification we found no instance of such projects in our sample during this early period of foreign investment in China. A minute number of records (about one in a thousand) indicated some form of "research" activity, but these were not necessarily the type subject to exogenous uncertainty, and there were too few cases for a separate analysis. Our results are robust to excluding these cases altogether or including them as development cases.

Scope-related uncertainty (H6): Similar to several other studies (e.g., Reuer, Park and Zollo, 2002), we measure the degree of scope-related uncertainty by using a count measure which captures the number of activities performed in the JV. This count measure increases with each of the following activities that are conducted in the JV: manufacturing, marketing, services, and development.

[15] To test the robustness of our results, we used the 18-month volatility of the parallel rate (again the common timeframe) as an alternative measure of exchange rate uncertainty. The results were consistent with those reported below.

Control variables. We control for a number of additional factors that may influence the ownership structure of a JV. Firstly, we control for the *duration* of the JV, using the logarithm of the ex ante specified contractual duration of the JV. Foreign investors entering in an equity JV in China are required to determine the duration of the project ex ante (Beamish, 1993; Shan, 1991). The duration of an option determines its value insofar as longer time horizons provide more opportunities for the option to become in-the-money (Jarrow and Turnbull, 2000). Secondly, we control for the *total size* of the JV using the logarithm of the dollar amount invested by both partners. We also control for the experience of the foreign investor in China, measured as the logarithm of the number of years since the foreign investor formed its first JV in China. Furthermore, we create period fixed-effects for the different five-year plans[16] of the Chinese Communist Party. These capture general differences in the business environment across periods. Finally, we control for *industry* differences. There is evidence of inter-industry differences in the patterns of ownership of foreign subsidiaries (Kobrin, 1987). Furthermore, the C.C.P. preferred to keep control over strategically and symbolically important industries, which might also influence the ownership distribution in certain industries. Therefore, we classified all JVs by two-digit SIC code based on the description of their activities and business scope. Subsequently, we created industry fixed-effects for every two-digit SIC code.

Estimation

We consider two important characteristics of our data in choosing the appropriate method to test our hypotheses. Firstly, our dependent variable is censored because the Chinese government only allows foreign ownership to range from a minimum of 25% to a maximum of 99.9%. Foreign investors might actually prefer an ownership share outside this range but end up taking a share somewhere between 25% and 99.9%, choosing the value

[16] Our sample covers (parts of) the 5th (1976-1980), 6th (1981-1985), 7th (1986-1990) and 8th (1991-1996) plans. The period effects are lagged by one year because these plans were usually announced at the end of the year. Thus, fixed effects represent the periods 1979-1981, 1982-1986 and so on.

closest to their true preference. Indeed, a substantial number of observations have either boundary value. Not controlling for the censored dependent variable is likely to lead to biased results (Greene, 2003). Secondly, our data is hierarchically structured, with units at two different but nested levels. The lower level consists of the individual JVs, which we label with the subscript *i*. The higher level, which we will label with subscript *j*, represents the different countries of origin of the foreign investors. Failing to take into account the multilevel structure of the data would possibly result in underestimated standard errors (Hox, 1995).

Given these considerations, we use a multilevel Tobit model to test our hypotheses. More specifically, we use a random-intercept multilevel Tobit model with double censoring.[17] The general formulation of such a model, given in terms of an index function, is (Greene, 2003; Hox, 1995):[18]

$$y_{ij}^{*} = \beta X_{ij} + e_{ij} + u_{j},$$

$$y_{ij} = y_{ij}^{*} \qquad \text{if} \quad 25 < y_{ij}^{*} < 99.9$$

$$y_{ij} = 0 \qquad \text{otherwise}$$

Testing Null Hypotheses

In the social sciences, and especially in management and international business, testing that two variables have no effect on each other has been done using a technique called statistical power analysis (e.g., Brock, 2003; Casher and Geiger, 2004; Cohen, 1977, 1990; Lane, Cannella and Lubatkin, 1998). Advocates of this approach argued that ex post power calculations could be used to interpret non-statistical results. Despite its popularity, the use of

[17] Our model comprises two levels, JV and home country. Such a model is also referred to as a Tobit model with double-censoring and random-effects. Here, the random effects are for home countries.

[18] Several scholars have argued that JVs in which one partner has a very dominant controlling stake can be better considered as wholly owned subsidiaries (e.g., Hennart, 1991). Therefore, to test the robustness of our results, we also specified several models with different limit values of ownership – such as upper limits of 90% (e.g., Hennart, 1991) and 95% (e.g., Hennart and Larimo, 1998; Lu, 2002) ownership. Our results were robust to these alternative Tobit specifications.

post hoc power analysis to test null hypotheses has been severely criticized. Among others, Hoenig and Heisey (2001) criticized the post hoc use of power analysis in general, and the use of the "observed power" and "detectable effect size" approaches in particular, for being misleading and meaningless due to the fact that for any test the *observed power* is a 1-to-1 function of the observed p-value and therefore does not add to the interpretation of the results.[19] Therefore, we used a series of more robust alternative approaches to post hoc power analysis to test our null hypotheses. We will discuss these in detail below.

Despite the reservations about post hoc power analysis, some power applications are still considered to be appropriate and useful. These include the use of power analysis in meta-analyses, and the ex ante determination of the minimum sample size for designing studies (e.g., Colegrave and Ruxton, 2003; Hoenig and Heisey, 2001). The latter power application is proper and relevant for our purpose. Namely, we use an ex ante approach to determine the minimum sample size that is needed to be able to pick up any existing relationships between our independent and dependent variables. More specifically, we implement Cohen's (1977: 440) multiple regression table conservatively by calculating the minimum sample size given that the effect size is assumed to be extremely small (R^2=.015), no more than 50 independent variables are used (including fixed effects not reported in our tables of results), and the power of the test (1-β) as desired ex ante is 0.99 (i.e. β=α=.01).[20] This reveals that the minimum sample size we need to be able to observe even an extremely small effect size is 4,373, which is well below our sample of 6,472 observations. Hence, we can exclude the possibility that we fail to find any effects due to an insufficiently large sample size.

[19] We are grateful to an anonymous Reviewer and the Associate Editor for pointing out this issue and putting us on the path towards using the alternatives below.

[20] In the language of power analysis, α is the significance criterion, i.e. the "level of significance" as commonly used to evaluate (non-null) hypotheses. β is the probability of rejecting the null hypothesis when it is in fact false, i.e. of making a type II error. The value we set for these parameters is more conservative than those used by Lane, Cannella and Lubatkin (1998), for example. Note that β as referred to in this paragraph is a parameter for the power calculations, not to be confused with the β coefficient estimates from regression analyses as discussed elsewhere in the chapter.

To then test whether an effect is indeed null, several scholars have suggested examining the practical magnitudes of the effects and analyzing the range of possible effect sizes that are (not) supported by the data (e.g., Colegrave and Ruxton, 2003). The practical magnitudes of the effects can simply be examined by taking the partial derivatives of the coefficients and evaluating the effect of a one-standard deviation (for continuous variables) or one-unit (for binary variables) change in the variables. However, this only informs us about the mean of all possible values the true effect can take. Therefore, Hoenig and Heisey (2001) and Colegrave and Ruxton (2003) recommended that researchers investigate the range of effect sizes rather than just their mean value. To do so, we follow an approach similar to the one suggested by Johnson (2005) and Colegrave and Ruxton (2005) to interpret non-significant results and test null hypotheses. This approach considers simultaneously the range and the position (relative to zero) of the distribution that the true effect size can have, and thus allows us to calculate the probability that the real effect size is larger or smaller than a trivial value. This probability can be written as:

$$F(\beta > d) \quad \text{or} \quad F(\beta < d),$$

where

β is the true coefficient,
$F = \text{normal}(\beta, SE_\beta)$,
SE is the standard error of β,
d is a trivial effect.

For this test it is important to specify what is to be considered a trivial effect size. Several methods to determine d have been suggested in the literature (e.g., Murphy and Myors, 2004). One is a deductive method based on well-established theory. We do not deem this method appropriate in this study because it presumes that there is a wealth of previous research to draw on. Alternatively, an inductive method might be used. This is appropriate when there are sufficient relevant data, derived for instance from meta-analyses. However,

such data are again not available in our case. Although neither of these approaches is helpful in our particular case, we can use a third method to identify values that are meaningful vs. trivial. Namely, we use the minimum effect size we observe for the exogenously resolved sources of uncertainty and the maximum effect size we observe for the endogenously resolved sources of uncertainty as starting points. This also allows us to contrast both forms of uncertainty.

We ascertained the reliability of our measures of endogenous uncertainty (and others) in two ways. Firstly, we used measures that have oft been used in the literature and particularly in studies that focused on the same empirical setting as ours and resulted in significant findings (e.g., Luo, 2005; Oxley and Sampson, 2004; Pan, 1996; Reuer, Zollo and Singh, 2002). This indicates that sufficiently established and noise-free measures are on hand. Secondly, we conducted nomological validity testing – a method that is commonly used to test the validity of psychological constructs (Cronbach and Meehl, 1955). Namely, using the same sample, we found that our independent variables are significantly related to various dependent variables (such as indicators of investment size and timing) in a manner consistent with extant theory.

RESULTS

Descriptive statistics and pairwise correlation can be found in Table 1. The negative correlations between our measures of economic uncertainty, local institutional uncertainty and exchange rate uncertainty, respectively, and the foreign share in the JV are consistent with our hypotheses 1, 2 and 3. Conversely, the correlations between the measures of the three sources of uncertainty that are resolved endogenously – i.e. cultural, development (capabilities) and scope-related uncertainty – and the foreign share in the JV are positive. Additionally, the correlations do not suggest that collinearity might be a problem.

TABLE 1
Descriptive Statistics and Correlations

	Variable	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10
1	**Foreign Share**	47.869	20.080	1.000									
2	**Ln(Duration)**	2.829	0.528	0.435	1.000								
3	**Ln(Size)**	8.300	1.489	0.310	0.588	1.000							
4	**Ln(Experience)**	0.103	0.392	0.012	0.110	0.078	1.000						
5	**Economic Uncertainty**	72.295	8.178	-0.080	-0.166	-0.254	-0.068	1.000					
6	**Local Institutional Uncertainty**	0.676	0.468	-0.041	-0.036	0.073	-0.047	-0.055	1.000				
7	**Exchange Rate Uncertainty**	0.599	0.639	-0.197	-0.157	-0.173	0.016	-0.519	0.002	1.000			
8	**Cultural Uncertainty**	1.067	1.290	0.117	0.157	0.103	0.053	-0.021	-0.030	0.015	1.000		
9	**Development Uncertainty**	0.016	0.124	0.034	0.024	-0.009	-0.019	0.027	0.008	-0.020	0.044	1.000	
10	**Scope-related Uncertainty**	1.078	0.285	0.072	0.069	0.055	-0.009	0.086	0.020	-0.161	0.039	0.218	1.000

Number of observations = 6472. Absolute correlations above 0.032 are significant at $p < .01$.

Examination of the distribution of equity shares shows that the values are broadly dispersed over the allowed range of 25%-99.9%, and no more than 20% of cases are censored (either to the right or to the left). This falls well below the threshold whereby an extreme proportion of censored cases may bias Tobit estimates. The multilevel Tobit results, obtained

TABLE 2
Results of the Multilevel Tobit Models of the Foreign Partner's Equity Share in a JV

		Model 1		Model 2		Model 3		Model 4		Model 5	
	Constant	11.796	****	11.223	****	36.393	****	10.919	***	37.252	***
		(3.094)		*(3.364)*		*(4.866)*		*(3.936)*		*(5.272)*	
	Ln(Duration)	15.643	****	15.479	****	14.854	****	15.435	****	14.828	****
		(0.659)		*(0.654)*		*(0.652)*		*(0.654)*		*(0.653)*	
	Ln(Size)	-0.441		-0.244		-0.228		-0.239		-0.226	
		(0.290)		*(0.295)*		*(0.294)*		*(0.295)*		*(0.294)*	
	Ln(Experience)	-2.457	****	-2.179	***	-2.482	****	-2.158	***	-2.462	****
		(0.702)		*(0.689)*		*(0.683)*		*(0.689)*		*(0.683)*	
H1	**Economic Uncertainty**					-0.278	****			-0.279	****
						(0.043)				*(0.043)*	
H2	**Local Institutional Uncertainty**					-1.819	***			-1.853	****
						(0.582)				*(0.583)*	
H3	**Exchange Rate Uncertainty**					-6.671	****			-6.560	****
						(0.680)				*(0.685)*	
H4	**Cultural Uncertainty**							-0.816		-0.858	
								(0.841)		*(0.826)*	
H5	**Development Uncertainty**							-0.075		0.395	
								(2.264)		*(2.246)*	
H6	**Scope-Related Uncertainty**							2.125	*	1.170	
								(0.978)		*(0.982)*	
	Period Fixed-Effects	Included		Included		Included		Included		Included	
	Industry Fixed-Effects	Excluded		Included		Included		Included		Included	
	σ_u	4.429	****	4.316	****	4.214	****	4.241	****	4.138	****
		(0.946)		*(0.928)*		*(0.918)*		*(0.909)*		*(0.895)*	
	σ_e	21.305	****	20.841	****	20.653	****	20.832	****	20.650	****
		(0.221)		*(0.216)*		*(0.214)*		*(0.216)*		*(0.214)*	
	ρ	0.041		0.041		0.040		0.040		0.039	
		(0.017)		*(0.017)*		*(0.017)*		*(0.016)*		*(0.016)*	
	Log-likelihood	-24559.68	****	-24430.10	****	-24373.89	****	-24427.22	****	-24372.58	****
	LL ratio relative to model 2					112.42 (3)	****	5.76 (3)			
	LL ratio relative to model 3									2.62 (3)	
	Nobs	6472		6472		6472		6472		6472	
	Uncensored	5173		5173		5173		5173		5173	
	Left-Censored	1085		1085		1085		1085		1085	
	Right-Censored	214		214		214		214		214	

Standard errors are in parentheses.
All tests are two tailed: † p <.10 * p <.05 ** p <.01 *** p<.001

from Stata 10, are reported in Table 2. Model 1 represents a baseline model including all control variables except for the industry fixed effects, while model 2 includes the industry fixed effects. In model 3 measures of the sources of uncertainty which are resolved exogenously (only) are added. Model 4 includes our measures of the three endogenous forms of uncertainty (only). Finally, model 5 includes measure of all sources of uncertainty

simultaneously. The model likelihood chi-squares show that every model is significant ($p<.001$) relative to an intercept-only model.[21]

We also conduct likelihood-ratio tests to determine the joint significance of, respectively, the exogenous and endogenous forms of uncertainty. The likelihood-ratio can be useful to evaluate our null hypotheses as it allows us to evaluate the strength of evidence for one hypothesis versus another (Johnson, 2005; Royall, 1997). The likelihood-ratio test shows that adding the three sources of uncertainty which are resolved exogenously to model 2 as we did in model 3, significantly increases the fit of the model ($\chi^2=112.42$ for three variables; $p<.001$). In contrary, the addition of the three sources of uncertainty which are resolved endogenously to model 2, as we did in model 4, does not improve model fit ($\chi^2=5.76$ for three variables). Finally, in model 5 we add the three sources of endogenous uncertainty to the model which includes all the sources of exogenous uncertainty (model 3). This also reveals that the endogenous sources of uncertainty do not contribute significantly to model fit ($\chi^2=2.62$ for three variables). Overall, the joint significance of the exogenous forms of uncertainty and the lack of joint explanatory power of the three endogenous forms of uncertainty are in line with our hypotheses.

The results of models 1 and 2 show that, among the control variables, only JV duration has a significant (positive) effect. This is consistent with the existence of an NPV component in real option investments (Dixit and Pindyck, 1994). Likewise, the foreign partner's experience has a significant (negative) effect. Inclusion of industry effects does not substantially change the interpretation of the results.

Exogenously Resolved Uncertainty

In model 3, we find a negative and significant relationship ($p<.001$) between foreign share and our measure of economic uncertainty. This is consistent with hypothesis 1.

[21] A step-wise approach adding each hypothesized variable separately does not substantively change the results.

Similarly, we find a negative and significant relationship ($p<.01$) between foreign share and our measure of local institutional uncertainty, supporting hypothesis 2. Finally, we find that foreign investors will take a smaller share when our measure of exchange rate uncertainty increases. Thus, hypothesis 3 is strongly supported ($p<.001$). When we add to model 3 the effects for endogenously resolved uncertainty, as in model 5, we find almost identical results, with hypotheses 1, 2 and 3 supported; indeed, the significance of local institutional uncertainty (hypothesis 2) improves to $p<.001$. Thus, our findings strongly support our first three hypotheses. The results for the exogenously resolved sources of uncertainty are, as expected, in line with real option logic.

Endogenously Resolved Uncertainty

Model 4 adds the effects of endogenously resolved uncertainty. In line with hypothesis 4 (and contrary to what might be expected if real option logic were mis-applied), we find no relationship between foreign share and our measure of cultural uncertainty. Similarly, in line with hypothesis 5, we find no relationship between foreign share and the presence of development activities indicating uncertainty about partner capabilities. In model 4, we do not find a negative relationship between foreign share and our measure of scope-related uncertainty in the JV; indeed the coefficient is significant and positive in model 4, but becomes insignificant in the more completely specified model 5. Either way, this is in line with hypothesis 6. The coefficients of the other two sources of endogenously resolved uncertainty remain insignificant in model 5. Thus, the overall results are in line with hypotheses 4, 5 and 6. As expected, real option predictions do not hold when uncertainty can be resolved endogenously, and thereby the source of uncertainty departs from the assumptions underlying option logic.

Effect Magnitudes

Examination of the practical magnitudes of the hypothesized effects confirms the statistically significant results. Based on the partial derivatives of the coefficients in model 5, the marginal effect of a one-standard deviation increase in economic uncertainty lowers the foreign partner's equity stake by 2.2%. Likewise, the dependent variable is approximately 1.8% lower when the investment is in a Special Economic Zone or Coastal City with lower local institutional uncertainty. A one-standard deviation increase in exchange rate uncertainty, meanwhile, lowers the dependent variable by over 4.1%. Besides being statistically non-significant, the practical magnitudes associated with endogenous sources of uncertainty are only a fraction of those of the exogenous variables. The marginal effect of a one-standard deviation change in cultural uncertainty lowers the foreign partner's equity stake by just 1%. The dependent variable is about 0.4% higher in JVs that encompass development activities. Likewise, a one-standard deviation change in the scope-related uncertainty increases the dependent variable by 0.3%. Comparing continuous variables, the magnitudes of the exogenously resolved variables are over twice as large as (and up to 13 times larger than) those of endogenously resolved variables. Likewise, comparing binary variables, the endogenously resolved variable has a magnitude 4.5 times greater than the exogenously resolved variable. Overall, the average of the absolute values of the practical magnitudes of the exogenous sources of uncertainty is more than 4.5 times greater than that of the endogenous sources of uncertainty. This analysis is again consistent with our predictions, and we hope that this also illustrates the value of paying more attention to the substantive magnitude of observed effects in international business research as well as in related fields, whether or not authors are interested in null hypotheses (Shaver, 2008).

Analyzing the Range of the Effect Magnitudes

Analyzing the practical magnitudes of the effects revealed strong differences between exogenously and endogenously resolved sources of uncertainty. This provides essential information about the mean of all possible values that the true effect can take, but not about the range of values that the true effect can take (and therefore confidence in the mean). Therefore, we investigated the entire range of effect sizes, which also allows us to calculate the probability that the true effect of each hypothesized coefficient is larger than a trivial value. As it is difficult to specify what is a trivial effect size, we consider several plausible and empirically informed cutoff values for trivial effects.

First, we considered a 1% change in the dependent variable as cutoff for a trivial effect. Of all the endogenous sources of uncertainty, a one-standard deviation change in cultural uncertainty has, with an impact of 1%, the largest effect on the dependent variable. Furthermore, a 1% change in ownership is the smallest change we can observe in our data; given rounding, any observed 1% change may in fact be much smaller yet. Hence, this is a meaningful cutoff. The probabilities that a 1% decrease in the foreign partner's ownership of the JV results from a one-standard deviation increase in economic uncertainty ($p=.999$), a unit-increase in institutional uncertainty ($p=.924$), and a one-standard deviation increase in exchange rate uncertainty ($p>.999$), respectively, are all very high. In contrary, the probabilities that a 1% decrease in the dependent variable results from respectively a one-standard deviation increase in cultural uncertainty ($p=.500$, by definition), a one-unit increase in development uncertainty ($p=.265$), and a one-standard deviation increase in scope-related uncertainty ($p<.001$) are considerably lower.

Second, we considered a 1.8% change in the foreign partner's ownership stake as a cutoff for a trivial effect. A 1.8% change is meaningful in that the effect of a one-unit change in institutional uncertainty equals 1.8%, which is the lowest effect of all three sources of

exogenous uncertainty. We find that the probabilities that 1% decrease in the dependent variable results from, respectively, a one-standard deviation increase in economic uncertainty (p=.900), a one-unit increase in institutional uncertainty (p=.500, by definition), and a one-standard deviation shift in exchange rate uncertainty (p>.999) are again considerable. Conversely, the corresponding probabilities for the endogenously resolved forms of uncertainty are less than half of those values: cultural uncertainty (p=0.248), development uncertainty (p=.161), and scope-related uncertainty (p<.001).

Finally, we replicate the analysis using 2.5% as a cutoff value. This is motivated by the fact that a 2.5% change in ownership corresponds, on average, to a $100,000 increase in the equity investment made by the foreign partner in our data. The tests reveal a similar pattern. Namely, the probabilities that an increase in each of the exogenous sources of uncertainty result in a decrease in the dependent variable that is larger than 2.5% are still considerable, while those of the endogenous sources are small (p<.100).

Overall, across a range of different cutoff values for a trivial effect, we find high probabilities that the true effect of the exogenous sources on the dependent variable is non-trivial. In contrast, the probabilities that the true effects of the endogenously resolved sources of uncertainty are non-trivial are considerably smaller. These consistent differences between the exogenous and endogenous resolved sources of uncertainty provide strong support for our hypotheses.

Hoenig and Heisey (2001) also argued that Bayesian methods provide an alternative approach to evaluate null hypotheses. To further test robustness of our results, we generated the posterior distributions of our coefficients using a Bayesian Tobit model.[22] Analyzing the

[22] We generated the posterior distributions using uninformative priors and the Gibbs Sampler. This involves sampling sequentially from all relevant conditional distributions over a large number of iterations. We made 100,000 draws from a single continuous Gibbs chain of which the first 20,000 draws are used as a "burn in" period and subsequently discarded. Unfortunately existing Bayesian software is limited in that it does not allow for random effects and cannot incorporate left-censoring and right-censoring simultaneously. The replication is

posterior distributions of the coefficients of the exogenously resolved sources of uncertainty revealed that all three are negative and distinctly different from zero. By contrast, the posterior distributions of the coefficients of the endogenously resolved sources of uncertainty are centered around zero. Further details of our Bayesian analysis are available from the authors upon request.

In summary, by every method proposed by Hoenig and Heisey (2001), Colegrave and Ruxton (2005), and Johnson (2005), amongst others, we find consistent support for the predictions whereby exogenous uncertainty leads to a real option-consistent choice of equity shares, and conversely consistent support for the predictions whereby endogenous uncertainty does *not* lead to such outcomes.[23]

DISCUSSION

The results advance our understanding of the boundary conditions for real option theory. In real option theory, one of the main predictions is that higher levels of uncertainty will increase option value, which will in turn increase the likelihood of the occurrence of a real option investment. In JVs this will result in a smaller ownership share for the call option holder. However, we also argued that this logic would not hold when uncertainty is resolved endogenously rather than exogenously. When uncertainty is resolved exogenously, we indeed find a negative relationship between economic uncertainty (hypothesis 1), local institutional uncertainty (hypothesis 2), and exchange rate uncertainty (hypothesis 3), respectively, and the foreign share in a JV. These results confirm the power of real option logic when it comes to exogenous uncertainty. We also examined the relationship between cultural uncertainty (hypothesis 4), uncertainty about development capabilities (hypothesis 5) and scope-related uncertainty (hypothesis 6), respectively, and the foreign share in a JV. Using appropriate

therefore imperfect. Nevertheless, our results are very similar to those obtained using the conventional (non-Bayesian) Tobit model.

[23] In addition, we replicated the commonly used if statistically problematic use of post hoc power analysis to test the null hypotheses 4-6. The results, available from the authors, again show that the effects of the endogenously resolved variables do not differ from zero.

techniques meant to test null hypotheses, we find no support for the statistical relationship that would follow from a real option model. Thus, as we argued, conventional real option logic is applicable when uncertainty is resolved exogenously, but not when it is resolved endogenously.

This study has implications for both scholars and practitioners. Firstly, our framework makes it possible to identify under what conditions an investment can truly be expected to represent a real option. A wide range of investments has been classified as real option investments, and previous empirical results have shown inconsistent support for real option theory. We argue that this may be because real option logic might inadequately characterize investments that are subject to endogenously resolved uncertainty. Our research also confirms that real option theory has strong predictive power in the presence of exogenous uncertainty. While we did not examine the performance implications of JV stakes, the results are consistent with arguments whereby real options can be an effective means of dealing with uncertainty when undertaking strategic investments – provided the uncertainty is exogenous.

Secondly, as appealing as using real options metaphorically may be, this should only be done while keeping carefully in mind what sources of uncertainty the option is meant to hedge, and whether the uncertainty is resolved endogenously. Thirdly, researchers and practitioners should be aware of the boundaries of the theory when they use it to examine potential investments. Using real option logic to value projects when it is not suitable is likely to lead to suboptimal decision-making. Adner and Levinthal (2004a, 2004b) argued that practitioners might be able to make use of real option logic when uncertainty is resolved endogenously, but only if they compensate for endogeneity by putting control systems into place and by changing the design of the organization. However, this is likely to require a costly trade-off, as such mechanisms may impede progress, and the organizational costs may outstrip the quasi-option value thus obtained.

Similarly, researchers might be able to make use of real option logic when uncertainty is resolved endogenously – but only if their formal models, and equally importantly their empirical analyses, incorporate the unique characteristics and consequences of endogenously resolved uncertainty. Sophisticated decision-theoretic models with endogenous uncertainty have been developed in the operations research and economics literatures (Koussis, Martzoukos and Trigeorgis, 2007; Pawlina and Kort, 2006), and have started to find their way in international business and strategy research such as Chi and Seth's (2009) work on MNE entry mode choices. However, these modeling developments have so far been accompanied by a relative dearth of empirical evidence about the actual feasibility and impact of such strategies. From this standpoint, our study does not imply that it is necessary to "shut down" research on real options when uncertainty is endogenous. However, it implies that such research should duly and explicitly incorporate the endogeneity of uncertainty. Furthermore, it must also develop and build upon compelling, generalizable empirical evidence about whether the strategies for real options with endogenous uncertainty are feasible and cost effective in practice, notwithstanding the computational and organizational costs that they add.

The implications for joint venture research are substantive too. While numerous scholars have looked at the conditions under which JVs are more or less appropriate (e.g., Contractor and Lorange, 2002; Hennart, 1988), the determinants of the ownership distribution of JVs have received far less attention in the JV literature (Cuypers and Martin, 2007), and studies have produced comparatively disappointing empirical results (e.g., Gatignon and Anderson, 1988). Our results confirm that a real option perspective can be useful in modeling equity share decisions in JVs, although we show that this is only true when uncertainty is resolved exogenously.

Furthermore, our model describes determinants of the optimal level of ownership for a foreign investor. This is especially relevant in dealing with highly (exogenously) uncertain markets, which is a basic reason to consider JVs in the first place. Our findings thus point to the importance of carefully specifying the relationship between various sources of uncertainty and a firm's expansion strategy, as a firm's strategy should be in line with the nature of the uncertainties it faces. This highlights the need for and the rewards from a more precise conceptualization of uncertainty in the international business and strategy literatures.

Limitations and Suggestions for Further Research

This study is not without its limitations, and several suggestions for further research can be made. Firstly, we study the applicability of real option theory in one particular country. While China has become a favorite destination of foreign investment, future studies could verify our results in other national settings, provided local conditions are consistent with the use of JVs as real options. Secondly, we only look at one particular type of real option investment, namely the JV. However, our theoretical arguments hold regardless of the type of real option investments. Thus, it would be interesting to look at other types of real option investments such as in patenting and new business contexts. Thirdly, we look at six different sources of uncertainty. Future research could examine yet other sources of uncertainty to further evaluate where real option logic holds in practice.

Relatedly, a debate has arisen about the extent to which research activities should be thought of as real options. As mentioned above, our sample did not include pioneering technological research activities – as opposed to plain development activities, which are more akin to technical tasks (Kotabe, Martin and Domoto, 2003). Nevertheless, our framework offers a way to think about research activities too. By our logic, research aimed at pioneering new technology may represent a real option investment – but only if the resolution of the associated uncertainty is outside the control of the firm and therefore exogenous. Oriani and

Sobrero (2008) likewise point to the relevance of the distinction between industry-wide patterns of design upheaval whose resolution may depend on the uncoordinated efforts of multiple actors from various industries, and discrete projects within a dominant design. The former may represent (nearly) exogenous uncertainty that can occur at some stages of an industry's evolution, whereas the latter is normally endogenous. This distinction thus maps onto our discussion of exogenous vs. endogenous uncertainty, and future research encompassing this distinction may generate insights into specific conditions under which R&D can be effectively modeled as a matter of real options.

We examined the roles of different types of uncertainty on the ownership distribution of JVs from a real option perspective. However, our findings also have implications for alternative theoretical perspectives. For example, in transaction cost economics (TCE), behavioral uncertainty figures as an endogenous factor that can be addressed via governance decisions (Williamson, 1985). More specifically, a premise of TCE is that firms will opt for a governance structure which provides a higher level of control, in order to reduce the increased hazards of opportunistic behavior by the other party, when behavioral uncertainty is high. However, few TCE studies have looked at the equity distribution of JVs and these studies yielded mixed results. Gatignon and Anderson (1988) were able to explain the choice between full ownership and shared ownership, but they were generally unsuccessful in explaining the ownership distribution when a JV was chosen. Similarly, Delios and Beamish (1999) and Chen, Hu and Hu (2002) found ambiguous or no effects of factors causing behavioral uncertainty on the ownership distribution of JVs.

Given these mixed results in the TCE literature on JVs, our non-significant findings are not surprising. However, we must note that the variables we use to capture the level of endogenous uncertainty differ from the typical variables used in TCE studies, where measures typically focus on asset specificity and marketing intensity. Unfortunately we lack

such data for the JVs in our sample, although our JV-level control variables and industry fixed effects go some way towards accounting for such unobservables. Furthermore, although our empirical setting is all the more suitable to test real option predictions, it is far less suitable to explain the ownership distribution from a TCE perspective or from an agency perspective. Namely, due to China's unique JV legislation during the period of our sample, the correspondence between decision rights and control, respectively, and the level of ownership in JVs was not as close as in other contexts. In our setting, it may be more appropriate for TCE research to examine the allocation of key (managerial) positions instead (Chi and Roehl, 1997). Nevertheless, research exploring the implications of our findings for various alternative theoretical perspectives would be well warranted.

Finally, we use a dichotomous classification to distinguish between endogenously and exogenously resolved uncertainty. However, some sources of uncertainty may be more strictly endogenous (exogenous) than others. Therefore, a more continuous classification of how uncertainty is resolved could lead to additional insights, provided proper scales can be developed. Once this basis, it would also be worthwhile to extend the range of sources of uncertainty considered, including especially demand uncertainty (Delacroix and Swaminathan, 1991; Wholey and Brittain, 1989). Furthermore, an interesting avenue for future research would be to refine our conceptualization of uncertainty by identifying different types of uncertainty within the exogenous-endogenous classification, and to explore their implications. In particular, some forms of endogenous uncertainty may precipitate all-or-nothing investments (for instance, to shape industry structure) while others need not.[24]

CONCLUSION

Our study shows that the use of real options can be made more powerful, both academically and in practice, by paying extra attention to the sources and resolution of the

[24] We are grateful to an anonymous Reviewer and the Associate Editor for pointing out these research opportunities.

uncertainty that the options are meant to exploit. In the context of IJVs, we show that normal real option predictions are ineffective when uncertainty is resolved endogenously, but all the more powerful when the firm faces exogenous uncertainty. Given the prevalence of uncertainty in international operations, and of IJVs as a mode of entry, further research in this area is all the more justified.

CHAPTER 4[1]

THE IMPACT OF UNCERTAINTY, OWNERSHIP MISALIGNMENT AND EXPERIENCE ON SUBSIDIARY DYNAMICS

ABSTRACT

We predict and find that firms whose ownership levels in international subsidiaries are misaligned with the levels of uncertainty in the environment surrounding the subsidiary adapt their ownership levels to re-align with the environment. We argue that the impact of experience on the evolution of subsidiaries is contingent on the source and type of experience. Moreover, we theorize about how shifts in the levels of external uncertainty can have an opposing effect on subsidiary ownership stability depending on the direction of the shift. Using a sample of 726 Japanese-foreign subsidiaries established in 38 different host countries, we find support for our predictions. Overall, our arguments and findings improve our understanding of how subsidiaries evolve.

[1] This chapter is the result of joint work with Xavier Martin.

INTRODUCTION

During the last few decades international subsidiaries, including joint ventures (JVs) and wholly-owned subsidiaries (WOS), have been the subject of much investigation. While initial work on international subsidiaries mainly focused on ownership issues (Hennart, 1991), the focus of more recent studies has shifted towards issues pertaining to the instability of these subsidiaries. Several of these studies have shown that despite their enormous growth in numbers, many subsidiaries are unstable (Dhanaraj and Beamish, 2004). These high instability rates have been attributed to various factors including subsidiaries' ownership structures (Dhanaraj and Beamish, 2004), shifts in bargaining power (Inkpen and Beamish, 1997), and asymmetric levels of learning (Hamel, 1999).

One limitation of the research to date is that it primarily investigated subsidiary termination or the transition from one extreme ownership form to another, such as the shift from JVs to WOS or outright JV divestment. However, subsidiary dynamics can take other forms such as incremental changes in ownership levels, and contractual negotiations. Considering these intermediate phenomena relating to subsidiary dynamics offers new insights into the evolution of subsidiaries (Reuer and Ariño, 2002). Accordingly, we will look at how parents incrementally adjust their ownership levels in their overseas subsidiaries, rather than at extreme buyout or closure issues. More specifically, we will investigate to what extent parents' initial and subsequent ownership levels in a subsidiary are or become aligned with the levels of uncertainty[2] in the external environment. This has been shown to be a critical aspect of subsidiary dynamics (Lu and Hébert, 2005; Reuer and Ariño, 2002). Throughout this study, we will look at how different types of experience and learning determine to what extent a parent's ownership stake is aligned with the external environment and thereby at how they impact the evolution of a subsidiary. By doing so, we aim to make

[2] The concept of uncertainty we use throughout this paper corresponds to what Roberts and Weitzman (1981) and Cuypers and Martin's (2010) refer to as exogenously resolving uncertainty in the external environment. For simplicity we will refer to this as "uncertainty".

several contributions to both the literature on organizational learning, and the international business and strategy literatures on international subsidiaries.

Firstly, several studies have looked at the implications of misaligned ownership levels. These studies have looked at performance implications (Sampson, 2004) and at how firms adapt to re-align their ownership structures (Nickerson and Silverman, 2003). However, far less is known about what determines the extent to which ownership levels are misaligned. In this study we show how different types of experience and changes in the levels of uncertainty surrounding the subsidiary affect the level of ownership misalignment. This in turn has important implications for the dynamics of a subsidiary.

Secondly, we integrate and extend research on, respectively, subsidiary design and subsidiary evolution. Most studies have looked at either initial design issues or post-formation issues, but not at both. However, both stages are intertwined and a better integration of these literatures offers new insights into the evolution of subsidiaries (Cuypers and Martin, 2007). More specifically we will look at the determinants of ownership misalignment at formation and also later during the life of the subsidiary. This allows us to show that certain factors play a different role in each stage.

Thirdly, most studies have focused on internal factors such as the nature of a subsidiary's resources to evaluate whether a parent's ownership levels are aligned or not. To the best of our knowledge, no other study has directly looked at how uncertainty determines ownership misalignment and how it shapes a subsidiary's evolution. Taking this external focus allows us to explore issues which have been largely overlooked but are becoming increasingly important as firms more frequently form subsidiaries in highly uncertain foreign environments.

Fourthly, we provide clear evidence that parents adjust their ownership levels when they are misaligned with the external environment. Moreover, we recognize that substantial

heterogeneity exists in the rate and direction in which firms adapt their ownership levels. These insights help us understand under what conditions firms adapt faster and more appropriately to changing conditions in their environment.

Fifthly, we contribute to the literature on organizational learning by contrasting the effects of experiential learning and vicarious learning and showing that they have different effects. More specifically, we show that vicarious learning reduces the degree of ownership misaligned when the subsidiary is formed, i.e. firms learn to structure their subsidiaries from other firms. Conversely, we find that experiential learning leads to strategic momentum which has a negative impact on the degree of misalignment at formation. However, experiential learning has a positive effect once the subsidiary has been formed as it facilitates re-alignments in the ownership levels of the subsidiary. These findings also highlight that we should not take the positive effects of learning and experience for granted.

BACKGROUND

External Uncertainty and Subsidiary Ownership Levels

Firms establishing a new foreign subsidiary have to decide on how much ownership they will seek in their new venture. When making this important strategic decision firms face a trade-off between limiting their downside risk and capturing more of the subsidiary's upside potential (Pindyck, 1988). On the one hand, a lower level of ownership reduces a firm's exposure to the downside risk of entering into a subsidiary to its small(er) initial investment (e.g., Reuer and Leiblein, 2000). On the other hand, a higher level of ownership allows the firm to capture more cash flows from the subsidiary. No single level of ownership is universally superior or inferior and a firm's optimal level of ownership depends on various factors, including the levels of uncertainty surrounding the subsidiary. Namely, higher levels of uncertainty favor lower ownership levels as it becomes more important to limit your

downside risk. Contrary, low levels of uncertainty push for higher levels of ownership (e.g., Chi and McGuire, 1996; Cuypers and Martin, 2010). This relationship highlights that firms have to align their ownership level with the external environment.

As we mentioned above, firms make ownership decisions when they form a subsidiary, but these are not permanent decisions. At various times after the subsidiary has been founded, firms also need to decide whether or not to adjust their ownership levels. Both the initial ownership level and the post-formation ownership level can have a considerable impact on the subsidiary dynamics. Namely, the initial design of a subsidiary has an enduring impact on its stability (e.g., Beamish and Banks, 1987). Similarly, a change in the preferred level of ownership after the subsidiary is formed is likely to trigger instability and lead to changed subsidiary terms (e.g., Inkpen and Beamish, 1997). Therefore, it is crucial to assess and understand a firm's initial and post-formation ownership choices simultaneously in order to get a more complete understanding of subsidiary dynamics.

Ownership Levels and Misalignment at Formation

A vast literature has looked at firm's subsidiary design choices, including the ownership levels parent firms take. Most of these studies focused on improving our understanding of what the optimal levels of ownership are under certain conditions, and at least implicitly assumed that suboptimal ownership choices would be selected out by competitive forces (e.g. Gatignon and Anderson, 1988). Still, in practice it is not uncommon that firms get their ownership levels wrong when they form a subsidiary.

Early research investigating this issue showed that firms indeed frequently make ownership choices which are misaligned (e.g. Sampson, 2004; Nickerson and Silverman, 2003). Moreover, several studies have started to look at the implications of misaligned ownership levels. For example, Sampson (2004) looked at the performance implications of misalignment and found that alliances with misaligned governance structures are less

innovative. Lu and Hébert (2005) showed that IJVs with misaligned governance structures will be more likely to be terminated. Reuer and Ariño (2002) and Nickerson and Silverman (2003) looked at the dynamics of ownership structures and showed that firms make adaptations in order to reduce the levels of misalignment. Their findings also indicate that in many cases firms with inefficient ownership structures adapt rather than being selected out by competitive forces.

Although these studies have increased our understanding of the consequences of misaligned ownership structures, they leave us largely uninformed about the sources of misalignment. Furthermore, most of these studies focused on the consequences of ownership structures that are misaligned with internal factors, such as the nature of the firm's assets, rather than with external factors (e.g. Sampson, 2004; Reuer and Ariño, 2002). Nevertheless, it has been well established that external factors such as uncertainty impact both the levels of ownership firms take in their subsidiaries and post-formation dynamics (Yan and Gray, 1994; Makino, Chan, Isobe and Beamish, 2007).

Therefore, it is crucial to get a clearer picture of the determinants of subsidiaries' ownership structure misalignments with the external environment if we want to have a better understanding of their post-formation dynamics. Accordingly, we aim to identify factors which influence the extent to which firms' ownership structures are misaligned. More specifically, we are interested in the impact of experience and learning on a firm's initial ownership choice and thereby also on the need for post-formation adaptations. Reuer, Zollo and Singh (2002) found that a firm's experience trajectories affect the likelihood of post formation adjustments in the terms of alliances. We build on their work and offer new insights by contrasting the effects of experiential and vicarious learning on ownership misalignment and thereby also on post-formation subsidiary dynamics (hypotheses 1a, 1b and 2).

Misalignment and Post-formation Dynamics

A wide body of research has looked a subsidiary instability and dynamics. Within this literature there are differences in the way instability is defined or operationalized. However, the majority of (early) studies focused on subsidiary termination or the transition from one extreme ownership form to another (e.g. from JV to WOS). More recently scholars started to look at subsidiary dynamics in a broader way. For example, Reuer and Ariño (2002) looked at adjustments in the contractual terms of subsidiaries. Folta and Miller (2002) looked at firms increasing their ownership stake in equity partnerships. By also considering incremental adaptations, these studies help us to get a more complete view of the evolutionary paths of subsidiaries. In line with these studies, we will look at incremental changes in the ownership levels a firm has in a subsidiary.

As we discussed above, firms' ownership levels in their subsidiaries can be misaligned with the levels of uncertainty in the external environment. This can be the result of ownership choices made when the subsidiary is formed (Lu and Hébert, 2005) or from post-formation changes in the environment (Reuer and Ariño, 2002). Regardless of the cause, firms should then adjust their ownership levels to re-align with the external environment. In related research, Nickerson and Silverman (2003) found that firms in the for-hire trucking industry make necessary adjustments – in their case replacing employee drivers with owner-operators - to re-align their misaligned governance structure. They also found differences in the rate at which firms adapt resulting from heterogeneity in nature of the resources and contracts firms have. Reuer and Ariño (2002) found that firms adjust the contractual terms of their alliances when they are misaligned with the internal conditions of the alliance. However, they failed to find evidence that firms adjust to changes in the external environment.

The findings in these studies raise two issues. Firstly, Nickerson and Silverman (2003) and Reuer and Ariño (2002) only look at contractual changes and at internal factors that determine the rate of adaptation. In contrast, we are looking at changes in firms' equity stakes. We can expect equity changes to require more resources and to be more costly than simply adjusting contractual terms. Therefore, the conditions for adjustments in ownership levels are all the more important to examine (hypothesis 3). Furthermore, we will show that experience can explain differences in the adaptation rates across firms. Reuer, Zollo and Singh (2002) argued that certain types of experience might help firms to adjust to unforeseen conditions. Accordingly, we will examine whether and under what conditions firms with higher levels of certain types of experience have higher adaptation rates than other firms (hypothesis 4).

Secondly, the mixed empirical evidence about the conditions under which firms adapt to changes in the external environment warrants our attention. As we mentioned before, we lack understanding of what drives misalignment ex ante. However, the empirical evidence in Reuer and Ariño (2002) implies that the general premise that changes in the environment trigger adjustments is too simplistic. To address this, we will examine under which conditions changes in the level of uncertainty in the external environment will lead to post-formation adjustments (hypothesis 5a and 5b). More specifically, we will look at the direction in which the ownership structure of a subsidiary is misaligned and argue that in certain situations changes in the external environment will be more likely to lead to re-alignment.

In sum, two broad issues are understudied in the existing literature. Firstly, little is known about the antecedents of initial and post-formation ownership misalignment in foreign subsidiaries. To examine this we will focus on different types of learning and on the asymmetric effect of changes in the levels of uncertainty in the external environment. Secondly, little is known about how misalignment triggers adaptation and which factors

influence the rate of adaptation. Specifically, we will examine how experience helps firms to adapt their misaligned ownership structures.

HYPOTHESES

Strategic Momentum and Misalignment at Formation

Firms rely heavily on routines in their decisions and actions, including those decisions pertaining to their corporate development activities; over time, these routines become reinforced and refined through experience (Nelson and Winter, 1982). Given that a firm's actions are guided by these routines, it is not surprising that firms continue to pursue the actions for which they have well developed and strongly embedded routines. Indeed, firms often exhibit a pattern of repeated actions of the same kind. In other words, actions are often driven by strategic momentum which entails that the probability that a firm pursues a certain action increases with the number of times they have pursued the same action in the past (Amburgey and Miner, 1992; Kelly and Amburgey, 1991; Martin and Park, 2004). For example, Haleblian, Kim and Rajagopalan (2006) found that past acquisition experience positively affects the likelihood of pursuing additional acquisitions. Similarly, Amburgey and Miner (1992) showed that in the context of acquisition activity firms have a tendency to repeat actions they have previously taken. Martin and Park (2004) found that firms who have formed a high number of alliances of a particular type have a higher propensity to form subsequent alliances of the same type. In line with these studies, and since ownership decisions represent another type of the corporate development choices that have been shown to exhibit momentum, we expect to see firms who have engaged in subsidiaries with high levels of equity ownership to continue to do so in their subsequent subsidiaries. Similarly, firms that have more experience with low levels of equity in subsidiaries should be more likely to take similar low levels of equity in subsequent subsidiaries.

Meanwhile, drawing on transfer theory, Haleblian and Finkelstein (1999) showed that there are limits to the transferability of prior experiences. More specifically, they argued that transferring routines can have a negative effect when the setting from which they are transferred differs from the setting to which they are transferred. Again, the context for their research was corporate development activities (acquisitions). Likewise, experience and strategic momentum should push firms to persist with taking similar levels of equity as they took in previous subsidiaries even if the setting is different or has changed. Furthermore, positive learning effects cannot be taken for granted in dynamic environments because lessons learned from previous experience are more likely to not apply anymore (Levitt and March, 1988). Hence, strategic momentum can be all the more problematic for international subsidiaries which tend to be surrounded by higher but also more diverse levels of uncertainty (Miller, 1992).

As a result, equity levels which were aligned with the surrounding environment in terms of uncertainty in other locations may be misaligned with what is required given the current levels of uncertainty in a given location. The ensuing misalignment can take two forms: On the one hand, strategic momentum can lead to firms taking equity levels which are too high for the local conditions, i.e. excessive levels of equity. We expect this form of misalignment to be more likely for those firms which have more experience with wholly-owned subsidiaries, as momentum would lead them to make subsequent investments with high levels of ownership too even if the subsequent investments are joint ventures. On the other hand, strategic momentum can push firms to take equity stakes which are too low, i.e. insufficient levels of equity. The probability of observing insufficient levels of equity should be higher for firms with higher levels of experience with jointly owned subsidiaries as they are more likely to persist with lower levels of equity and not to entertain taking higher ownership of subsequent ventures. Accordingly, we predict:

Hypothesis 1a: The higher the foreign parent's experience with wholly-owned foreign subsidiaries, the more likely the foreign parent will opt for an excessive equity stake in subsequent subsidiaries.

Hypothesis 1b: The higher the foreign parent's experience with jointly owned foreign subsidiaries, the more likely the foreign parent will opt for an insufficient equity stake in subsequent subsidiaries.

The Substituting Effect of Vicarious Learning on Post-formation Adaptation

In the previous section, we argued that routinization through experience can explain misalignment between a firm's ownership level in a subsidiary and the levels of uncertainty surrounding the subsidiary. However, not all types of experience need to have such a negative impact. Specifically, Reuer, Zollo and Singh (2002) argued that certain types of experience can help firms to design their alliances more effectively when they are formed and thus *substitute* for post-formation adaptation. We expect that observing other firms' activities, i.e. learning from the experience of others, can help firms to design their alliances more effectively.

Firms do not only learn from their own experiences, they also learn from other firms. This vicarious learning allows firms to explore alternatives without incurring the cost associated with experiential learning (Miner and Haunschild, 1995, Barkema and Schijven, 2008). Several studies have provided evidence of vicarious learning and its benefits. For example, Ingram and Baum (1997) showed that Manhattan hotels which benefit from the operating experience of other Manhattan hotel chains survive longer. Shaver, Mitchell and Yeung (1997) provided evidence of the positive effects of vicarious learning by showing that foreign entrants benefit from prior foreign entrants by having longer-lived foreign

subsidiaries. Looking at strategic alliances using a perceptual performance measure, Sarkar, Echambadi and Ford (2003) found that vicarious learning has a positive impact on alliances particularly in dynamic environments.

This body of literature also revealed that firms mainly benefit from vicarious learning when establishing new subsidiaries, and less so afterwards (Baum and Ingram, 1998; Guillén, 2002; Ingram and Baum, 1997). Furthermore, contrary to experiential learning, vicarious learning is more varied and does not depend on the path-dependent history of a single firm (Ingram and Baum, 1997). As a result, we expect vicarious learning to help firms to take a more optimal level of ownership when they establish their own subsidiaries. Therefore, we hypothesize:

Hypothesis 2: The higher the foreign parent's levels of vicarious learning, the lower the level of ownership misalignment at formation.

Misalignment and Post-formation Adaptation

Ownership misalignment can result either from suboptimal ownership choices made when the subsidiary is founded, or from post-formation changes in the environment even though the initial decision was appropriate (Reuer and Ariño, 2002). Regardless of the source, misalignment is costly and this will pressure firms to adapt their ownership levels (Nickerson and Silverman, 2003; Sampson, 2004). Furthermore, these costs depend on the direction in which a firm's ownership levels are misaligned.

This applies to joint venture ownership decisions too. On the one hand, misalignment can result from firms taking insufficient levels of ownership considering the levels of uncertainty in the environment. In this case, firms reduce their downside risk more than necessary while at the same time foregoing valuable cash flows because of their lower equity

stake (Pindyck, 1988). On the other hand, misalignment can arise from firms taking excessive levels of ownership. In this case firms will be able to capture a larger share of the cash flows from their subsidiary, however, they will be exposed to excessive levels of downside risk. Hence, regardless of the direction in which a firm's ownership level is misaligned, there will be costs associated with it, albeit costs of a different nature. In order to achieve higher levels of profitability or simply to survive competitive pressures, firms will look for ways to increase their performance (March and Simon, 1993). Indeed Nickerson and Silverman (2003) found evidence that trucking firms adjust their use of company drivers and owner-operators after deregulation in the for-hire trucking industry. Reuer and Ariño (2002) found that firms adapt the contractual terms of their alliances when these are not aligned anymore with the internal conditions of the alliance. Similarly, we expect firms to address misalignment with the external conditions and adjust their ownership levels to levels that are more in accordance with their environment. Hence, we expect:

> *Hypothesis 3: A foreign parent will adjust its ownership level in a subsidiary when it is misaligned with levels of uncertainty in the environment surrounding the subsidiary.*

The Facilitating Role of Experience on Post-formation Adaptation

Although we expect firms to adapt their misaligned ownership levels, we do not expect them all to adapt at the same rate. A variety of factors might influence a firm's adaptation rate. For example, Nickerson and Silverman (2003) showed that firms' adaptation rates differ depending on whether they have formal or informal contracts. Another factor we expect to have an important impact on a firm's adaptation rate is the firm's prior experience.

Reuer, Zollo and Singh (2002) showed that a firm's prior experience can have a *facilitating* effect on post-formation changes in the terms of alliances. More specifically, they

argue that prior experience with alliances helps firms to develop routines related with the capacity to appropriately modify alliances over time. In other words, firms with more experience have a better understanding of the need to adjust and have a higher ability to successfully make adjustments if they are required. Accordingly, we expect more experienced firms to have a higher rate of adaptation when their ownership levels are misaligned with the levels of uncertainty surrounding the subsidiary. However, the facilitation effect of uncertainty will not be as pronounced for all types of experience (Reuer, Zollo and Singh, 2002).

Facilitating experience may arise from previous experience with forming and operating joint ventures as well as from previous experience with adjusting their terms. By gaining experience with the formation and operation of subsidiaries firm learn to recognize when their ownership levels are misaligned, when to adjust them and in what direction they need to be adjusted. Through previous adjustments in ownership, firms learn how to arrange and put into effect such adjustments. Of the two, we expect the facilitation effect to be stronger for experience with actually making adjustments to the ownership levels of a subsidiary. This is because it provides direct and focused experience of the task on hand, which maximizes learning. Several studies have argued that effect of prior experience is stronger when experience is transferred between tasks with high levels of similarity (e.g., Cormier and Hagman, 1987; Finkelstein and Haleblian, 2002; Zollo and Reuer, 2008). Such should be the case with such a specific task as ownership adjustment.

By contrast, prior experience with subsidiaries will establish and refine routines of successfully operating and managing a subsidiary. These routines potentially help to facilitate one particular aspect of managing a subsidiary, i.e. adjusting the ownership structure. However, managing a subsidiary entails a lot more than adjusting ownership structure. Moreover, firms do not face the need for, and challenges associated with ownership structure

adjustments in all subsidiaries. Hence, the routines firms developed through subsidiary management experience in general may only provide limited guidance in the process of adjusting ownership structure.

Therefore, having specific experience at the task of adjusting the ownership structure should be more valuable in helping to facilitate subsequent adjustments than general experience of managing subsidiaries. Accordingly, we expect:

> *Hypothesis 4: The rate of adaption of misaligned ownership levels will be higher for foreign parents with higher levels of prior subsidiary and adaptation experience. However, the effect of prior adaptation experience will be stronger than that of prior subsidiary experience.*

Uncertainty and Ownership Misalignment

As mentioned before, misalignment can result from changes in the environment after the subsidiary has been established (Reuer and Ariño, 2002). In line with this, several studies have looked at how changes in the environment, and in particular changes in the levels of uncertainty, affect subsidiary dynamics (e.g., Yan and Gray, 1994; Makino, Chan, Isobe and Beamish, 2007). Makino, Chan, Isobe and Beamish (2007) observed that changes in the external conditions increase instability in international JVs. Yan and Gray (1994) found that changes in the policies of local governments lead to changes in relative bargaining power between the partners and thereby trigger JV instability. In a conceptual paper, Zajac and Olsen (1993) argued that changes in an alliance's environment result in a reconfiguration of the alliance as a result of changes in the value of the alliance.

In this stream of research, some more recent studies introduced an intermediate concept in the theoretical argument by linking changes in the environment to governance

misalignment and thereby to instability (Nickerson and Silverman, 2003; Reuer and Ariño, 2002). However, Nickerson and Silverman (2003) did not empirically establish the link between regulatory changes in the environment and misalignment. Moreover, Reuer and Ariño (2002) found that alliance partners are no more or less likely to adjust the alliance's contract when the alliance is subject to environmental change.

Despite the mixed empirical results, the general premise in this body of literature is that firms' ownership structures are aligned and that changes in the environment subsequently lead to misalignment. As a result, changes in the environment will cause instability and/or trigger adaptation. However, we argue that environmental changes can also lead to less misalignment and a lower need for adaptation, in the case where the ownership was misaligned to start with and the environment changed in such a way as to make this misalignment less severe. More specifically, we argue that a change in uncertainty will have an asymmetric effect on the level of misalignment depending on whether the parent had excessive or insufficient levels of uncertainty prior to the change.

Cuypers and Martin (2010) found a negative relationship between the level of exogenous uncertainty and the ownership levels firms take in a foreign subsidiary. Subsequently, an increase in uncertainty should make lower ownership levels more desirable. Assuming that a firm's ownership level was well-aligned before the change in the environment, this will result in the firm's ownership levels being misaligned after the change. In turn this will push the firm to re-align its ownership levels. However, in practice firms' ownership structures are not always aligned before changes in the environment occur (Reuer and Ariño, 2002). Therefore, the direction in which a firm's ownership levels are misaligned will determine whether a firm needs to adapt or not. If a firm has an excessive level of ownership in its subsidiary, an increase in uncertainty will further misalign its ownership structure. Hence, an increase in uncertainty will increase the need for and likelihood of

adaptations to the level of ownership. Conversely, if a firm has insufficient levels of ownership, then a subsequent increase in uncertainty will re-align its ownership structure without any adaptations in the ownership structure. Hence, we expect:

Hypothesis 5a: An increase in the level of exogenous uncertainty surrounding the subsidiary will further misalign the ownership levels of foreign parents which have excessive ownership levels before the increase in uncertainty.

Hypothesis 5b: An increase in the level of exogenous uncertainty surrounding the subsidiary will re-align the ownership levels of foreign parents which have insufficient ownership levels before the increase in uncertainty.

RESEARCH DESIGN

Sample

We test our hypotheses using longitudinal data on foreign subsidiaries by Japanese automotive vehicle assemblers and parts manufacturers covering a period from 1979 until 2001. The primary source of our subsidiary-level data is the *Japan Auto Parts Industry Directory* which was published every three or four years by *Dodwell Marketing Consultants*. This directory provides detailed information about the ownership, location, history and activities of each subsidiary. We tracked each subsidiary across different editions using subsidiary and parent names and locations. Parent-level information was collected from the same source. We then used common country-level data sources, including *Euromoney*, and the *International Country Risk Guide*, to compile our county-level uncertainty variables.

The data source listed 1,005 foreign subsidiaries of 327 Japanese parents in 47 different host countries that were documented in at least two issues of our data source. From this list, we excluded subsidiaries for which we had incomplete (1) subsidiary-level, (2) host

country-level, and/or (3) parent-level data. Using these selection criteria, our final sample includes 726 foreign subsidiaries of 196 Japanese parents in 38 host countries. Overwhelmingly, the partners were local companies for which systematic data was unfortunately not available.

The context of our data is particularly interesting to study the effects of uncertainty and experience on subsidiary adaptations for a number of reasons. Firstly, Japanese data in general (e.g. Delios and Beamish, 2001; Hennart, 1991; Makino and Beamish, 1998) and more specifically data on the Japanese automotive industry (e.g. Martin, Swaminathan, and Mitchell, 1998) have been widely used in strategy and international business research. These studies have shown that the Japanese context provides a platform to test theories with similar levels of external validity compared to those in other contexts such as North America (Dhanaraj and Beamish, 2004). Secondly, Japan was the world's second largest source of FDI (behind the United States) during the period of our sample (UNCTAD, 2002). This provides a large number of observations covering a wide range of host countries. As a result, we have substantial levels of variation in the Japanese parents' levels of experience and in uncertainty in the host countries. Finally, it has been well documented that Japanese firms have a high propensity to use JVs and not just wholly-owned subsidiaries as a vehicle to enter new markets (Delios and Beamish, 1999). As a result, we observe the entire range of possible ownership levels in our sample, which makes the data all the more complete.

Model Specification and Estimation

To test our hypotheses, we follow a two-step procedure similar to the ones used in Anderson (1988), Nickerson and Silverman (2003) and Reuer and Ariño (2002). In a first step, we determine to what extent a parent's equity stake in a subsidiary actually corresponds with the equity stake we theoretically would expect given the level of uncertainty surrounding the subsidiary. Cuypers and Martin (2010) modeled the impact of exogenous

uncertainty on equity share decisions in overseas subsidiaries for a different sample of investments (into China). Using a two-tailed Tobit model, they found that parents setting up new overseas subsidiaries in environments with higher levels of exogenous uncertainty will take smaller ownership stakes in their subsidiary. In line with their model, we use a two-tailed Tobit model with various sources of uncertainty as independent variables to calculate the levels of equity we would expect given the levels of uncertainty. The model and each of the uncertainty variables are highly significant ($p<.001$) and largely consistent with Cuypers and Martin's (2010) findings (Appendix 1). Subsequently, we calculate the difference between the expected ownership stakes based on the model, and the actual ownership stakes we observe. That is, we set ownership misalignment equal to the residual for each observation.

In a second step, we test our hypotheses using ownership misalignment as our dependent variable. Specifically, we use cross-sectional OLS models for the hypotheses (Hypotheses 1 and 2) that focus on misalignment at formation.

$$Ownership\ Misalignment_{i(Formation)} = \beta_0 + +\beta_{ki}X_{ki} + \varepsilon_i$$

where

ε_i is a normally distributed error term,
X_{ki} are the independent variables.

Hypotheses 3 through 5 evaluate how firms adapt their misaligned ownership structures after the subsidiary is established. Accordingly, we use fixed-effects partial (dynamic) adjustment models similar to those employed by Haveman (1992, 1993) and Nickerson and Silverman (2003) to test these hypotheses. Our model takes the following form:

$$Ownership\ Misalignment_{i(t+1)} = \beta_0 + \beta_1\ Ownership\ Misalignment_{it} + \beta_k X_{kit} + \alpha_i + \varepsilon_{it}$$

where

α_i is the fixed effect for a parent's equity stake in a given subsidiary,
ε_{it} is a normally distributed error term,
X_{kit} are the independent variables.

Dependent Variables

We calculate the level of ownership misalignment as described above and in Appendix 1. We use the variable as such, which varies theoretically from –99% (where the parent took almost no equity when it should have taken maximum equity) to +99% (where the parent took nearly complete equity when it should have taken minimum equity), to test hypotheses 1a/1b and as basis for splitting our sample for hypotheses 5a/5b. Hence, negative values correspond to a situation where a Japanese parent has an insufficient equity level, while positive values imply that the parent has an excessive level of equity in its subsidiary.

In our other hypotheses we are interested in the degree of misalignment rather than its directionality. In those cases, in order to facilitate the interpretation of our results, we use the absolute value of the level of misalignment as our dependent variable. We label this *Absolute Ownership Misalignment*. As a result, Absolute Ownership Misalignment ranges from 0, which occurs when the parent's equity stake corresponds perfectly to the equity stake we predicted, to (almost) 100 which occurs when the parent's equity stake is exactly opposite to what we predicted (i.e. whether the firm took almost no equity when it should have taken maximum equity or vice versa).

Independent Variables

Economic uncertainty: The degree of economic uncertainty is measured using the *Euromoney* country risk index. This oft-used index measures the economic uncertainty of a country at a particular time on a scale from 0 to 100 based on credit (e.g., payment records),

analytical (e.g., economic performance forecasts), and market indicators (e.g., selldown performance). The index comprises a mix of market perception and objective measures.

***Political uncertainty*:** We capture the level of political uncertainty using Henisz' political hazards index (Henisz, 2000). This index is oft used and captures the extent to which a change in the preferences of any single branch of government can result in a change in government policy. The measure ranges from zero (the lowest level of political uncertainty), to one (the highest level of political uncertainty).

***Institutional Uncertainty*[3]**: As a measure of institutional uncertainty, we used the component of the *Economic Freedom of the World* index which captures the level of uncertainty resulting from a country's institutional framework. This index is published annually by the Fraser institute and has been recoded so a higher score represents higher levels of institutional uncertainty.

***Overall International Experience*:** A Japanese Parent's overall international experience was measured as the count of the total number of foreign subsidiaries that it has been involved in preceding the focal observation.

***Overall International Adaptation Experience*:** This variable is measured as the total number of equity adjustments a Japanese partner has made in all its foreign subsidiaries preceding the focal observation.

***Overall International JV Experience*:** This variable is measured as the total number of foreign JVs a Japanese partner has been involved in preceding the focal observation.

***Overall International WOS Experience*:** We use the count of total number of foreign WOS a Japanese partner has been involved before the focal observation.

[3] As alternative measures of institutional uncertainty, we used the separate components of the *International Country Risk Guide* index which captures the level of uncertainty resulting from a country's institutional framework. Our results remain robust. However, these alternative measures are available for less subsidiaries and years, considerably reducing our sample size.

***Country-specific Experience*:** We measure the parent's experience in a given host country as the count of the total number of subsidiaries that it has been involved in preceding the focal observation in the corresponding country.

***Country-specific Adaptation Experience*:** This measure is operationalized as the total number of equity adjustments a parent has made in the same country preceding the focal observation.

***Country-specific JV Experience*:** This variable is measured as the total number of JVs a Japanese partner has been involved in preceding the focal observation in the same host country.

***Country-specific WOS Experience*:** We use the count of total number of WOS a Japanese partner has been involved before the focal observation in the same host country.

***Vicarious Learning*:** We proxy the amount a parent learns from other sample firms in a focal host country as the count of the number of Japanese parents that have been active in the same host country preceding the focal observation. We expect that with an increased number of other Japanese parents in a host country, the pool of experience from which a focal Japanese parent can benefit increases (Shaver, Mitchell and Yeung, 1997).

Vicarious Adaptation Learning: This variable was measured as the total number of equity adjustments Japanese parents made in the corresponding host country preceding the focal observation.

***Vicarious JV Learning*:** This variable is measured as the total number of foreign JVs all Japanese parents has been established in the same host country preceding the focal observation.

***Vicarious WOS Learning*:** We measured vicarious WOS learning as the total number of foreign WOS all Japanese parents has been established in the same host country preceding the focal observation.

Control Variables

We control for a number of additional factors that may influence equity misalignment and/or adaptation. Firstly, we measure the Japanese parent's performance as its net profits in millions of Yen. Secondly, we control for the *age* of the subsidiary, measured by the number of years since subsidiary foundation. Thirdly, we also control for the strategic importance of the subsidiary using the ratio of the subsidiary's number of employees to those of its parent. Fourthly, we include year fixed effects to control for potential trends and other sources of unexplained heterogeneity.

RESULTS

Descriptive Statistics

Table 1 the reports the means, standard deviations, and correlations for all variables. In panel A of Table 1, we provide information on the variables appearing in the subsample we use to analyze the degree of misalignment at formation. The descriptive statistics and correlations for the variables we use in the full sample are reported in panel B. Overall, the magnitudes of the correlations between our independent variables are moderate, which suggests that multicollinearity is not a problem. This is confirmed by the variance inflation factors for all our variables appearing in the models, which are all below the accepted rule of thumb value of 10 (Neter, Wasserman and Kutner, 1985).

Examination of the distribution of ownership levels shows that the values are broadly dispersed over the possible range of 1%-100%. Similarly, we find that the level of Ownership Misalignment is normally distributed.

Strategic Momentum and Misalignment at Formation

The models examining the effects of strategic momentum on the degree and directionality of misalignment when the subsidiary is established are reported in Table 2. Here we use the untransformed value of the degree of misalignment as dependent variable.

Table 1: Descriptive Statistics and Correlation

Panel A: Descriptive Statistics and Correlation for the initial formation subsample

	Variable	Obs	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Ownership Misalignment	442	-12.617	29.185	1.00												
2	Absolute Ownership Misalignment	442	25.167	19.404	-0.56	1.00											
3	Vicarious Learning	442	151.224	145.888	0.01	-0.06	1.00										
4	Overall International Experience	442	9.975	9.799	0.05	0.00	-0.05	1.00									
5	Country-specific Experience	442	1.776	1.645	-0.03	0.00	0.48	0.49	1.00								
6	Overall International WOS Experience	442	3.636	4.984	0.19	-0.06	-0.05	0.83	0.35	1.00							
7	Overall International JV Experience	442	6.339	6.289	-0.07	0.05	-0.04	0.90	0.48	0.50	1.00						
8	Country-specific WOS Experience	442	0.640	1.110	0.24	-0.13	0.48	0.29	0.72	0.39	0.14	1.00					
9	Country-specific JV Experience	442	1.136	1.149	-0.27	0.13	0.21	0.42	0.74	0.12	0.55	0.06	1.00				
10	Vicarious WOS Learning	442	74.425	92.639	-0.03	-0.07	0.96	-0.09	0.45	-0.07	-0.09	0.51	0.14	1.00			
11	Vicarious JV Learning	442	76.799	62.889	0.06	-0.03	0.91	0.01	0.45	-0.02	0.03	0.36	0.29	0.75	1.00		
12	Relative Size	442	268.724	899.737	-0.04	0.03	-0.07	0.11	0.05	0.13	0.08	0.13	-0.05	-0.03	-0.11	1.00	
13	Parent Profitability	442	4698.534	10900.960	-0.05	-0.03	-0.05	0.23	0.18	0.15	0.24	0.12	0.14	-0.02	-0.10	0.29	1.00

Panel B: Descriptive Statistics and Correlation for the complete sample

	Variable	Obs	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Absolute Ownership Misalignment (t+1)	1987	23.19	19.71	1.00													
2	Absolute Ownership Misalignment	1987	23.18	19.71	0.85	1.00												
3	Vicarious Learning	1987	167.27	166.94	-0.05	-0.05	1.00											
4	Overall International Experience	1987	13.05	9.87	0.00	0.00	-0.19	1.00										
5	Country-specific Experience	1987	1.85	1.53	0.01	0.00	0.46	0.34	1.00									
6	Vicarious Adaptation Learning	1987	27.32	29.15	-0.02	-0.01	0.82	-0.07	0.33	1.00								
7	Overall International Adaptation Experience	1987	2.28	3.26	0.01	0.01	-0.08	0.52	0.12	0.04	1.00							
8	Country-specific Adaptation Experience	1987	0.37	0.73	0.01	0.00	0.07	0.11	0.16	0.16	0.45	1.00						
9	Political Uncertainty	1987	0.31	0.24	0.03	0.02	-0.38	-0.01	-0.18	-0.26	-0.04	-0.07	1.00					
10	Economic Uncertainty	1987	17.57	17.77	0.14	0.12	-0.46	0.06	-0.22	-0.30	0.03	0.00	0.58	1.00				
11	Institutional Uncertainty	1987	2.59	1.03	0.11	0.08	-0.55	0.06	-0.26	-0.35	0.01	0.00	0.48	0.84	1.00			
12	Subsidiary Age	1987	14.64	7.57	-0.13	-0.12	-0.07	0.30	0.00	0.11	0.29	0.25	-0.08	0.03	0.00	1.00		
13	Relative Size	1987	160.10	618.68	-0.05	-0.06	-0.05	0.07	-0.01	-0.10	0.06	-0.06	0.00	-0.04	-0.02	-0.03	1.00	
14	Parent Profitability	1987	5322.17	14047.97	-0.01	0.01	0.00	0.16	0.13	-0.06	0.07	0.01	0.00	-0.05	-0.05	-0.05	0.17	1.00

This allows us to investigate the direction of the misalignment. The results in models 1 and 2 show that parents with more overall international WOS experience ($p<.001$) or more host country-specific WOS experience ($p<.001$) are more likely to take higher levels of equity. Thus, as we predicted in hypothesis 1a, higher levels of prior WOS experience increase the likelihood that parents take excessive amounts of equity. Conversely, we find that parents with higher levels of overall international WOS experience ($p<.001$) or more host country-specific WOS experience ($p<.001$) are more likely to take lower levels of equity in their subsequent subsidiaries. As predicted in hypothesis 1b, this increases the likelihood that parents with more prior JV experience take insufficient levels of equity in their subsidiaries. Hence, we find evidence of strategic momentum in parents' ownership decisions which contributes to higher levels of misalignment.

To explore these findings further we look at the probability that a parent either takes too much or too little equity in a subsidiary. To do so we estimate our coefficients using the logistic regression methodology with two different dummy variables as dependent variable. The dependent variable in models 4 and 5 equals 1 when a parent takes too much equity in a subsidiary while the dependent variable in models 6 and 7 equals 1 when a parent does not take enough equity in a subsidiary. In models 4 and 5, we find that higher levels of respectively a parent's overall international WOS experience ($p<.001$) and host country-specific experience ($p<.001$) increase the probability that the parent takes an ownership share in a subsidiary that is higher than desirable. Conversely, we find that higher levels of respectively a parent's overall international JV experience ($p<.001$) and host country-specific JV experience ($p<.001$) reduce the probability that a parent take too much equity in a subsidiary. In models 6 and 7, we look at the probability that a parent does not take enough equity in a subsidiary. This reveals that the coefficients for a parent's overall international the WOS experience ($p<.001$) and host country-specific experience ($p<.001$) are negative

Table 2: Misalignment at Formation: The Role of Strategic Momentum

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Constant	-0.696		2.029		-3.386		-0.107		0.239		-0.290		-0.682	†
	(3.289)		*(2.914)*		*(4.014)*		*(0.245)*		*(0.240)*		*(0.250)*		*(0.275)*	
Relative Size	-1.45E-03		-2.47E-03		-7.53E-04		6.75E-06		-7.76E-05		-1.16E-04		7.83E-05	
	(1.58E-03)		*(1.51E-03)*		*(1.64E-03)*		*(1.32E-04)*		*(1.43E-04)*		*(1.28E-04)*		*(1.49E-04)*	
Parent Profitability	3.94E-05		3.11E-05		-5.55E-05		-1.27E-05		-9.74E-06		1.71E-05		2.87E-05	†
	(1.32E-04)		*(1.24E-04)*		*(1.33E-04)*		*(1.29E-05)*		*(1.24E-05)*		*(1.27E-05)*		*(1.48E-05)*	
Overall International WOS Experience	1.625	***					0.122	***			-0.153	***		
	(0.312)						*(0.027)*				*(0.029)*			
Overall International JV Experience	-1.324	***					-0.074	***			0.115	***		
	(0.257)						*(0.022)*				*(0.024)*			
Country-specific WOS Experience			6.549	***					0.596	***			-1.410	***
			(1.161)						*(0.122)*				*(0.170)*	
Country-specific JV Experience			-8.247	***					-0.625	***			1.031	***
			(1.148)						*(0.115)*				*(0.141)*	
Vicarious WOS Learning					-0.013									
					(0.025)									
Vicarious JV Learning					0.010									
					(0.042)									
R-squared	0.13		0.20		0.05									
F-statistics	6.29	***	10.96	***	2.34	*								
Log Likelihood							-265.84		-248.08		-278.14		-221.02	
Chi-squared							56.67	***	92.19	***	62.92	***	177.16	***
Nobs	442		442		442		442		442		442		442	

All models include year fixed effects. Standard errors are in parentheses. All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

while coefficients for a parent's overall international JV experience (p<.001) and host country-specific JV experience (p<.001) are positive and significant. These results provide further support for hypotheses 1a and 1b.

The Substituting Effect of Vicarious Learning on Post-formation Adjustments

In models 8 through 11 (Table 3), we investigate whether vicarious learning has a substituting effect on post-formation equity changes as predicted in hypotheses 2. We investigate and contrast the effects of three types of experience/learning: vicarious learning, overall international experience, and host country-specific experience. In models 8, 9, and 10 we respectively look at each of these three types of experience individually, while model 11 is our full model which includes all three types of experience.

Table 3: Misalignment at Formation: The Substituting Role of Experience

	Model 8		Model 9		Model 10		Model 11	
Constant	25.161	***	22.134	***	23.162	***	24.525	
	(2.179)		*(2.308)*		*(2.130)*		*(2.686)*	
Relative Size	7.28E-04		6.54E-04		7.34E-04		6.82E-04	
	(1.10E-03)		*(1.11E-03)*		*(1.11E-03)*		*(1.11E-03)*	
Parent Profitability	-8.35E-05		-9.65E-05		-7.95E-05		-1.02E-04	
	(8.95E-05)		*(9.26E-05)*		*(9.15E-05)*		*(9.30E-05)*	
Vicarious Experience	-0.012	†					-0.014	†
	(0.007)						*(0.008)*	
Overall International Experience			0.080				0.011	
			(0.107)				*(0.131)*	
Country-specific Experience					0.004		0.524	
					(0.598)		*(0.810)*	
R-squared	0.02		0.02		0.01		0.02	
F-statistics	1.03		0.76		0.70		0.90	
Nobs	442		442		442		442	

All models include year fixed effects. Standard errors are in parentheses.
All tests are two tailed: † p < 0.10; * p < 0.05; ** p < 0.01; *** p<0.001.

In model 8 and 11, we find that vicarious learning significantly (p<.1) reduces the level of misalignment at formation. Hence, vicarious learning seems to assists parents in the initial structuring of their subsidiaries and helps them to choose a more optimal equity stake. As a

result of this reduction in misalignment, vicarious learning reduces the need for post-formation adaptations. This lends support for hypothesis 2. Parent's overall international experience and its host country-specific experience, by contrast, do not have a bearing on the level of misalignment at formation when we do not distinguish between JV and WOS experience as we did to test hypothesis 1. This suggests that indeed only vicarious learning has a substituting effect on post-formation equity changes.

Post-formation Ownership Misalignment and Adaptation

The regression results to test hypothesis 3 are presented in Table 4. All models are highly significant ($p<.001$) and have considerable explanatory power. Regarding hypothesis 3, Absolute Ownership Misalignment is positive and significant ($p<.001$) in model 12. Furthermore, at .772 the coefficient is significantly different from both 0 and 1. If adaptation were unconstrained, parents would perfectly realign their ownership levels regardless of the degree of misalignment in the previous period. Hence, the coefficient for Absolute Ownership Misalignment would be 0. In contrast, if the parent did not adapt its ownership level at all, the level of misalignment in the previous period would be a perfect predictor of misalignment in the subsequent period. This would correspond to the coefficient being equal to 1. Hence, as predicted in hypothesis 3, our results indicate that subsidiary parents at least partially adapt their equity levels in their subsidiaries to reduce the degree to which they are misaligned. In models 13 (Table 4), 18 and 22 (Table 5), 26 (Table 6) we introduce several other factors step-wise that we expected to influence the amount of adaptation and/or misalignment. Including these variables does not change the magnitude or significant level of the coefficient for the Absolute Ownership Misalignment variable. Hence, hypothesis 3 remains supported even after controlling for these variables.

Table 4: Post-formation Adaptation

	Full Sample				Insufficient Ownership				Excessive Ownership			
	Model 12		**Model 13**		**Model 14**		**Model 15**		**Model 16**		**Model 17**	
Constant	5.457	***	7.023	***	8.001	***	10.194	***	10.135	***	9.757	***
	(0.456)		*(0.720)*		*(0.785)*		*(1.063)*		*(0.794)*		*(1.263)*	
Absolute Ownership Misalignment	0.772	***	0.768	***	0.754	***	0.741	***	0.417	***	0.397	***
	(0.014)		*(0.015)*		*(0.020)*		*(0.021)*		*(0.032)*		*(0.032)*	
Subsidiary Age			3.28E-04				2.14E-03	***			-5.03E-03	*
			(4.38E-04)				*(6.00E-04)*				*(1.98E-03)*	
Relative Size			-4.53E-05	*			-1.29E-04	***			7.17E-05	*
			(1.94E-05)				*(2.93E-05)*				*(2.90E-05)*	
Parent Profitability			-0.090	*			-0.103	*			0.047	
			(0.036)				*(0.052)*				*(0.057)*	
R-squared	0.72		0.72		0.70		0.70		0.45		0.44	
Wald Chi-squared	2857.84	***	2857.59	***	1365.80	***	1341.63	***	169.82	***	161.41	***
Nobs	1989		1989		1031		1031		743		743	

All models include year fixed effects and fixed effect for each parent's stake. Standard errors are in parentheses.
All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

We also re-ran our models after splitting the sample depending on whether the Japanese parent has excessive or insufficient levels of equity in its subsidiary. In models 14 and 15 we look at the adaptation rate of those parents which took more equity than desirable in their subsidiary. We find coefficients of Absolute Ownership Misalignment which are respectively, .417 and .397 ($p<.001$) for this subset of parents. When we look at the coefficients in models 16 and 17 for the subset of parents which took less equity than desirable we find lower adaptation rates as indicated by a higher coefficient of the previous period's misalignment (i.e. greater stickiness), with coefficients of respectively .754 and .741 ($p<.001$). Although the adaptation rates of parents with too much equity ownership in their subsidiaries are higher than of those parents with too little equity ownership, each is significantly different from both 0 and 1.

Finally, our results indicate that the misalignment we observe is not the result of unobserved heterogeneity. Namely, if the ownership level of a parent we find to be misalignment was actually properly aligned given some unobserved characteristic, we would observe a coefficient which is not different from 1 (Nickerson and Silverman, 2003).

The Facilitating Effect of Experience

The models in Table 5, present the estimation results for six different types of interactions terms. We interact 6 different types of experience with the Absolute Ownership Misalignment variable. Given the structure of our models, negative coefficients for the interaction terms indicate faster rates of adaptation (more decrease in misalignment) while positive coefficients for the interaction terms indicate slower rates of adaptation. If experience indeed has a facilitating effect as predicted in hypothesis 4 we would expect parents with higher levels of experience to have higher adaptation rates.

In models 19, 20 and 21 we investigate the effects of vicarious experience, overall international experience, and host-country specific experience. Only the parent's overall

Table 5: Post-Formation Adaptation: The Facilitating Role of Experience

	Model 18		Model 19		Model 20		Model 21		Model 22		Model 23		Model 24		Model 25	
Constant	3.967	*	4.179	**	2.945	†	4.130	**	4.970	***	4.167	**	4.451	***	4.533	***
	(1.534)		*(1.576)*		*(1.602)*		*(1.580)*		*(1.283)*		*(1.320)*		*(1.293)*		*(1.285)*	
Absolute Ownership Misalignment	0.765	***	0.755	***	0.804	***	0.758	***	0.765	***	0.803	***	0.794	***	0.785	***
	(0.015)		*(0.021)*		*(0.023)*		*(0.022)*		*(0.015)*		*(0.019)*		*(0.017)*		*(0.016)*	
Subsidiary Age	-0.111	**	-0.111	**	-0.118	**	-0.110	**	-0.127	***	-0.131	***	-0.138	***	-0.127	***
	(0.038)		*(0.039)*		*(0.039)*		*(0.039)*		*(0.040)*		*(0.040)*		*(0.040)*		*(0.039)*	
Relative Size	3.22E-04		3.23E-04		3.25E-04		3.23E-04		3.94E-04		4.65E-04		4.32E-04		3.97E-04	
	(4.37E-04)		*(4.41E-04)*		*(4.36E-04)*		*(4.39E-04)*		*(4.40E-04)*		*(4.44E-04)*		*(4.40E-04)*		*(4.37E-04)*	
Parent Profitability	-4.86E-05	*	-5.00E-05	*	-4.86E-05	*	-4.92E-05	*	-4.23E-05	*	-4.28E-05	*	-4.26E-05	*	-4.10E-05	*
	(1.96E-05)		*(1.98E-05)*		*(1.96E-05)*		*(1.97E-05)*		*(1.95E-05)*		*(1.97E-05)*		*(1.95E-05)*		*(1.94E-05)*	
Political Uncertainty	-1.252		-1.312		-1.192		-1.282		-1.183		-1.230		-1.233		-1.242	
	(1.360)		*(1.368)*		*(1.358)*		*(1.364)*		*(1.349)*		*(1.356)*		*(1.347)*		*(1.344)*	
Economic Uncertainty	0.014		0.014		0.016		0.014		0.017		0.007		0.019		0.015	
	(0.029)		*(0.029)*		*(0.029)*		*(0.029)*		*(0.029)*		*(0.029)*		*(0.029)*		*(0.029)*	
Institutional Uncertainty	0.934	†	0.945	*	0.960	†	0.938	†	0.840	†	0.949	†	0.819	†	0.852	†
	(0.519)		*(0.523)*		*(0.518)*		*(0.521)*		*(0.493)*		*(0.497)*		*(0.492)*		*(0.490)*	
Vicarious Learning	4.13E-04		-1.95E-04		6.08E-04		4.11E-04									
	(2.43E-03)		*(3.05E-03)*		*(2.42E-03)*		*(2.44E-03)*									
Overall International Experience	0.037		0.038		0.110	*	0.037									
	(0.035)		*(0.036)*		*(0.049)*		*(0.036)*									
Country-specific Experience	0.317		0.318		0.318		0.257									
	(0.242)		*(0.244)*		*(0.241)*		*(0.307)*									
Vicarious Adaptation Learning									0.007		0.042	**	0.007		0.006	
									(0.010)		*(0.014)*		*(0.010)*		*(0.010)*	
Overall International Adaptation Experience									0.001		-0.001		0.345	*	-0.005	
									(0.099)		*(0.100)*		*(0.145)*		*(0.098)*	

Continued	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23	Model 24	Model 25
Country-specific Adaptation Experience					*0.924* *	*0.969* *	*0.942* *	*2.255* ***
					(0.431)	(0.434)	(0.431)	(0.644)
Abs. O. Misalignment x Vicarious Learning		2.83E-05						
		(8.43E-05)						
Abs. O. Misalignment x Overall International Experience			-0.003 *					
			(0.001)					
Abs. O. Misalignment x Country-specific Experience				0.003				
				(0.009)				
Abs. O. Misalignment x Vicarious Adaptation Learning						-0.002 ***		
						(0.000)		
Abs. O. Misalignment x Overall International Adaptation Experience							-0.014 ***	
							(0.004)	
Abs. O. Misalignment x Country-specific Adaptation Experience								-0.055 **
								(0.020)
R-squared	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Wald Chi-squared	2933.75 ***	2842.42 ***	2958.39 ***	2892.76 ***	2906.36 ***	2786.32 ***	2905.61 ***	2962.58 ***
Nobs	1989	1989	1989	1989	1989	1989	1989	1989

All models include year fixed effects and fixed effect for each parent's stake. Standard errors are in parentheses. All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

international experience seems to have a facilitation effect ($p<.05$), i.e. it increases the rate of adaptation. In models 23, 24, and 25 we look at the parents' experience at making adaptations. We find that a parent's vicarious adaptation experience, overall international adaptation experience and host country-specific adaptation experience all have a significant ($p<.01$ or lower) facilitating effect. All three sources of experience increase the rate of adaptation. The effect of a one-standard deviation change for each of the three types of adaptation experience on the adaptation rate is substantial (>4%) and at least twice as large than the effect of a one-standard deviation change in each of the three types of general subsidiary experience.

As predicted in hypothesis 4, these results confirm that experience indeed has a facilitating effect and accelerates the rate of adaptation. However, this effect is more pronounced for experience that relates directly to the specific task, i.e. making adaptations.

Uncertainty and Ownership Misalignment

In Table 6, we report the models which investigate the impact of changes in the level of uncertainty on the degree of misalignment. In model 26, we find no relationship between the degree of misalignment and our three measures of uncertainty for the overall sample including cases where we found excessive as well as insufficient ownership levels. This is not surprising given that we predict an asymmetric impact of changes in uncertainty on the degree of misalignment, depending on whether the parent has too much or not enough equity in the subsidiary.

In model 27, we look at the impact of an increase in the level of uncertainty on the level of misalignment for the subset of parents that had excessive ownership levels. We find that increases in the levels of economic ($p<.001$) and political ($p<.001$) uncertainty significantly increase the level of misalignment. Hence, increases in the level of uncertainty further misalign the ownership stake of a parent if its ownership levels were already too high.

However, we fail to find such an effect for political uncertainty. Thus, these results provide partial support for hypothesis 5a.

Table 6: Uncertainty and Post-Formation Misalignment

	Full Sample		*Excessive Ownership*		*Insufficient Ownership*	
	Model 26		**Model 27**		**Model 28**	
Constant	5.228	***	-1.900		18.532	***
	(1.220)		*(1.968)*		*(1.966)*	
Absolute Ownership Misalignment	0.766	***	0.238	***	0.657	***
	(0.015)		*(0.030)*		*(0.022)*	
Subsidiary Age	3.19E-04		-0.007	***	0.003	***
	(4.36E-04)		*(0.002)*		*(0.001)*	
Relative Size	-4.09E-05	*	1.39E-04	***	-1.59E-04	***
	(1.94E-05)		*(2.69E-05)*		*(2.99E-05)*	
Parent Profitability	-0.094	**	0.100	†	-0.127	*
	(0.036)		*(0.052)*		*(0.052)*	
Political Uncertainty	-1.451		-0.544		-3.966	*
	(1.344)		*(2.049)*		*(1.679)*	
Economic Uncertainty	0.016		0.214	***	-0.145	***
	(0.029)		*(0.042)*		*(0.038)*	
Institutional Uncertainty	0.791		3.670	***	-0.385	
	(0.485)		*(0.809)*		*(0.666)*	
R-squared	0.72		0.40		0.69	
Wald Chi-squared	2905.89	***	333.43	***	1191.16	***
Nobs	1989		743		1031	

All models include year fixed effects and fixed effect for each parent's stake. Standard errors are in parentheses.
All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

In model 28, we look at the subset of parents whose ownership levels are less than desirable. In accordance with hypothesis 5b, we find that increases in political uncertainty ($p<.05$) and economic uncertainty ($p<.001$) reduce the degree of misalignment. Thus, an increase in uncertainty re-aligns the ownership structure when the parent has a too small a share. However, Institutional Uncertainty does not have a similar significant impact on the degree of misalignment. Hence, we find partial support for hypothesis 5b.

DISCUSSION

We aimed to improve the understanding of the evolution of international subsidiaries. We achieve this by providing evidence that firms often have ownership level in their subsidiaries which are misaligned with the levels of uncertainty they face in the external environment. This has important implications for the evolution of these subsidiaries, as we show that firms adapt their ownership levels to reduce the degree of misalignment. Furthermore, we observe and explain why some firms adapt their ownership levels faster than others. Our findings contribute to the literature in several ways.

Firstly, we contribute to the literature on organizational learning by providing evidence of different types of learning – namely, differences between general JV learning and JV adaptation learning, and between vicarious and experiential learning. Furthermore, we reveal a complex relationship between a firm's prior experience and the dynamics of subsequent subsidiaries. Reuer, Zollo and Singh (2002) argued that experience can both *facilitate* and *substitute* for post-formation adjustments in alliances. We find evidence consistent with the facilitating effect of experience. Our results show that firms with higher levels of subsidiary experience in the same host country as the focal subsidiary adapt their ownership levels faster when it is misaligned. Furthermore, firms that have more adaptation experience exhibit faster adaptation rates than firms with general subsidiary experience or firms without any experience at all (hypothesis 4).

In order to investigate the substitution effect of experience, we look at experience as a determinant of ownership misalignment when the subsidiary is formed. As expected, we find that vicarious learning helps firms to better design their subsidiaries, thereby reducing the need for post-formation adjustments (hypothesis 2). This also highlights that firms benefit from the experience of previous entrants in a country. However, experiential learning does not seem to have a substitution effect. To the contrary, experiential learning seems to lead to

strategic momentum which in turn results in less optimal ownership levels when a subsidiary is formed. Firms with more WOS experience tend to take higher levels of ownership than optimal, while higher levels of JV experience tends to result in ownership levels which are lower than optimal (hypotheses 1a and 1b).

Hence, our results highlight three different but complementary effects of experience contingent on the type of experience and the stage in the life-cycle of the subsidiary: (1) a *substituting* effect at formation which results in more stable subsidiaries, (2) a post-formation *facilitating* effect and (3) a *momentum* effect at formation, which results in more unstable subsidiaries. This highlights the importance of differentiating between the source and type of knowledge firms accumulate in their international subsidiaries. Moreover, it further challenges the assumption that experience is always positive (Barkema and Schijven, 2008).

Secondly, we contribute to the international business and strategy literatures on subsidiary dynamics. Most studies in these literatures have focused on subsidiary survival and the shifts from one extreme ownership level to another. In contrast, we look at incremental ownership changes during the life of a subsidiary. This reveals that firms adjust their ownership levels to re-align with the external environment (hypothesis 3). While instability is often considered to be negative and an indication of failure (e.g., Barkema and Vermeulen, 1997), the re-aligning adaptations we observe can be considered positive and are likely to lead to increased performance.

In this study we also integrate research on subsidiary design and subsidiary evolution. This allows us to discuss how factors influencing a subsidiary's initial design in terms of ownership levels subsequently influence a subsidiary's evolution. Our findings highlight the rewards of simultaneously considering multiple stages of subsidiaries' life-cycles to get a more complete understanding of how subsidiaries evolve and adjust.

Finally, we show that firms need to align their ownership levels with the external environment. Most previous studies looking at ownership misalignment have mainly focused on internal factors (Nickerson and Silverman, 2003). However, we show that the external environment, and uncertainty in the environment in particular, is a key determinant of subsidiary dynamics. However, we find that changes in the external environment do not automatically lead to higher levels of ownership misalignment and instability (hypotheses 5a and 5b).

Limitations and Suggestions for Further Research

This study is not without its limitations, and several suggestions for further research can be made. Firstly, we study Japanese overseas subsidiaries. Although there are no reasons to believe that our findings are specific to Japanese firms, future studies could verify our results for firms from another home country. Similarly, we focus on the automotive industry. Theoretically there is no reason to expect that our findings do not apply to other industries, nevertheless, it would be interesting to look at other industries.

Secondly, we looked at the roles of different types of learning and experience. We contrasted the effects of experiential learning and vicarious learning. Future research might examine yet other sources or forms of knowledge accumulation. Thirdly, we examined how firms align or fail to align their ownership structure with the external environment. However, factors internal to the subsidiary also seem to be important drivers of ownership misalignment and subsidiary dynamics (e.g. Reuer and Ariño, 2002; Lu and Hébert, 2005). Due to data limitations we cannot simultaneously consider internal and external factors. Future research could also examine the interactions among internal and external factors. Notwithstanding these limitations and remaining research avenues, our study increases the understanding of how subsidiaries are designed and adjusted over time. Given the theory and results developed in this paper, further research in this area is well warranted.

APPENDIX 1: Calculating Ownership Misalignment

In a study of 6,472 Sino-foreign JVs formed between 1979 and 1996, Cuypers and Martin (2010) investigated the determinants of the ownership distribution of JVs. Their model describes determinants of the optimal level of ownership for a foreign investor. More specifically, they found a negative relationship between exogenously resolving sources of uncertainty and the foreign parent's level of ownership in a JV. The three exogenous sources of uncertainty they focused on were the level of institutional uncertainty, economic uncertainty and local institutional uncertainty. To estimate their coefficients they used a two-tailed Tobit model because their dependent variable, the foreign parent's equity share, is bounded.

For the purpose of our study we are interested in the degree of Ownership Misalignment. In order to calculate the degree of Ownership Misalignment we start from Cuypers and Martin's (2010) model to calculate the differences between the observed ownership levels and the expected ownership levels. In practice this corresponds to residual for each observation resulting from the model described below. Due to data constraints and minor differences in the empirical setting our model differs marginally from Cuypers and Martin's (2010) model. We can write our model as:

$$\begin{aligned} Ownership\ share_i &= \beta_0 + \beta_1 Political\ Uncertainty_i + \beta_2 Economic\ Uncertainty_i \\ &+ \beta_3 Institutional\ Uncertainty_i + \beta_4 Subsidiary\ Size_i + \beta_5 Parent\ Size_i \\ &+ \beta_6 Parent\ Profitability_i + \beta_7 Sales\ Activity_i + \beta_8 Cultural\ Distance_i \\ &+ \beta_9 Year\ Dummies_i + \varepsilon_i \end{aligned}$$

where *Political Uncertainty*, *Economic Uncertainty*, and *Institutional Uncertainty* are our three sources of exogenous uncertainty. We also control for the size of the parent and subsidiary, parent profitability, cultural distance, whether the subsidiary has any sales activities, and we add year dummies. All three sources of uncertainty are highly significant

(p<.001) and negative as expected, and the overall model is statistically significant (p<.001) and has considerable predictive power. The results are presented below:

	Ownership Stake	
Constant	82.612	***
	(7.079)	
Subsidiary Size	-5.315	***
	(0.471)	
Parent Size	6.828	***
	(0.775)	
Parent Profitability	0.000	***
	(0.000)	
Sales Activity	10.754	***
	(1.540)	
Cultural Distance	-3.022	***
	(0.724)	
Political Uncertainty	-10.474	**
	(3.417)	
Economic Uncertainty	-0.229	**
	(0.075)	
Institutional Uncertainty	-8.897	***
	(1.312)	
Log-likelihood	-13186.22	
Chi-squared	782.27	***

The model includes year dummies. Standard errors are in parentheses. All tests are two tailed: † p < 0.10; * p < 0.05; ** p < 0.01; *** p<0.001.

CHAPTER 5[1]

LEARNING FROM JOINT VENTURES:

THE ROLE OF EXPERIENCE ASYMMETRY

ABSTRACT

Extending research on the link between prior JV experience and the amount and distribution of value generated by a JV, we examine the effects of the level of asymmetry between JV partners' prior JV experience. Using a sample of 576 JVs, we show that both the partners' total JV experience and the degree of asymmetry in their levels of prior experience determine how much value is created upon JV announcement. Furthermore, the value distribution between the JV parties depends on the level of asymmetry in their respective JV experience. We discuss implications for practice and research on JVs and organizational learning.

[1] This chapter is the result of joint work with Xavier Martin.

INTRODUCTION

During the last decades the numbers of joint ventures (JVs) has grown dramatically. As a result, the study of JVs has aroused considerable enthusiasm in recent years among both scholars and practitioners of strategic investments. Various theoretical streams have resulted in a better understanding of JV types, purposes, scope and life stages.

An extensive body of research has also looked at the value implications of investing in JVs (e.g., McConnell and Nantell, 1985; Koh and Venkatraman, 1991; Balakrishnan and Koza, 1993; Madhavan and Prescott, 1995; Chan, Kensinger, Keown and Martin, 1997; Anand and Khanna, 2000; Merchant and Schendel, 2000; Kale, Dyer and Singh, 2002). These studies revealed that on average JV partners gain from entering into a JV. Yet, JVs vary greatly in how much value they create for their partners. These differences have been attributed to numerous factors such as the JV's structure, environmental characteristics and partner characteristics.

One major limitation of these studies is that they primarily investigated the wealth gains of individual partners, or in a few rare cases the total value created in a JV (e.g., Koh and Venkatraman, 1991). Contrary to the merger and acquisition (M&A) literature, they failed to examine how much value is created in total – the joint value that is created by all partners in the JV - and how this value is distributed among the JV partners (for an exception, see Gulati & Wang (2003)). The M&A literature has shown that generally there are wealth transfers from acquirers to target firms (e.g., Asquith, Bruner and Mullins, 1983; Morck, Schleifer and Vishny, 1990; Seth, Song and Pettit, 2002). Theoretically, we would expect similar asymmetric wealth gains in JVs too as JV partners are likely to have different abilities and opportunities to extract value from a JV (e.g., Hamel, 1991; Gulati and Wang, 2003). Indeed, Kumar (2007, 2010) found patterns of asymmetric wealth gains in JVs. This suggests that it might be impossible to have an accurate understanding of how much value individual

partners capture by looking at a single JV partner in isolation, i.e. without considering the other JV partners and their characteristics. Furthermore, several studies in the M&A literature have shown that the distribution of wealth is driven by different factors than those which influence the total amount of value that is created in a deal (e.g., Seth, 1990a; Seth, Song and Pettit, 2000, 2002; Cuypers, Cuypers and Martin, 2009). Hence, without considering both value creation and appropriation simultaneously, it remains unclear whether higher gains for an individual partner can be attributed to a JV which created more value or to the partner's ability to appropriate more value at the expense of its partners. Overall, it seems crucial to distinguish between *value creation* and the *value capturing* which has so far been largely ignored in the JV literature (Seth, 1990a, 1990b). We contribute to existing JV literature by making such a distinction. More specifically, we look at the total amount of value created in JVs using event study methodology and subsequently investigate how the value created is distributed among the partners.

A wide range of factors including JV structure, environmental characteristics and partner characteristics has been linked to JV value creation. In this paper, we examine the role of the prior JV experience of each JV partner on the total value that is created in a JV and how this value is distributed. Anand and Khanna (2000) found initial evidence of positive experience effects on JV performance and value creation. However, the effect of experience does not need to be positive in all circumstances. Several studies have shown that the effect of experience can be contingent. For example, Barkema, Bell and Pennings (1996) found that experience has to match the environment in order to beneficial and Anand and Khanna (2000) found that the effect of experience is contingent on the activities of the JV. Hence, experience has to fit with the environment and the activities of the JV. However, the learning literature has not addressed the possibility that there also has to be a fit between the different partners' experiences in inter-organizational settings. This is even though the JV literature has long

suggested that inter-partner fit is crucial and an important determinant of JV performance. Several dimensions of fit including cultural, strategic, and organization fit, have been explored and found to be relevant (Shenkar and Zeira, 1992; Geringer, 1991; Luo, 1997; Mowery, Oxley and Silverman, 1996). These findings suggest that fit in general is important, yet the fit of experience between JV partners remains largely unexplored. This paper fills this void by looking at the fit between each of the JV partner's experience and its effect on value creation and distribution. Furthermore, we identify a number of conditions under which such a fit in experience is more important.

By considering the experience of all of the JV partners, and examining the total value created and the way it is distributed, this paper aims to makes a significant contribution to the literature on JVs. In addition, we contribute to the research on organizational learning by looking at the degree of fit between the prior JV experience of each of the JV partners and how this influences value creation in a different way than the subsequent distribution of the value created. Furthermore, we argue that the need for experience fit is contingent on several factors internal and external the JV.

HYPOTHESES

Learning From Prior Joint Venture Experience

Several studies have looked at the potentially beneficial effect of prior JV experience on JV performance. These studies built on several ideas from the learning, evolutionary economics, and behavioral theory literatures (Reuer, Park and Zollo, 2002). The learning curve literature has examined how repetition and corrections in a manufacturing setting increase the performance of production activities (Argote, 1999). The evolutionary economics and behavioral theory literature looked at experience effects on a wider range of activities including JVs and M&As. Studies in these literatures argued that firms develop a

competence to manage certain activities by creating routines and capabilities (Cyert and March, 1963; Nelson and Winter, 1982). These routines and capabilities can then be retrieved and used in subsequent activities of a similar nature, which in turn offers the potential to improve performance. In the context of JVs, this implies that firms with previous JV experience will be able to make inferences from previous ventures and develop JV routines and capabilities which will allow them to improve performance in subsequent JVs (Anand and Khanna, 2000; Reuer, Park and Zollo, 2002).

Although several studies indeed found positive experience effects on JV performance (e.g., Anand and Khanna, 2000), others have failed to find such an effect (e.g., Barkema, Shenkar, Vermeulen and Bell, 1997) or found a negative effect (e.g., Reuer, Park and Zollo, 2002). We believe that some of these inconsistencies result from a number of empirical issues and the way JV performance is conceptualized. Firstly, these studies generally focused on a single partner's prior JV experience. Ignoring the other partners' experience may bias findings on JV experience, as it may underestimate or overestimate the JV's aggregate experience base. Failing to take into account both parties' prior experience has been shown to have a significant effect on results when studying performance in an M&A setting (Cuypers, Cuypers and Martin, 2009). Secondly, the JV studies generally focus on the performance implications for a single partner. However, it might be impossible to have an accurate understanding of how prior experience leads to value creation looking at a single JV partner in isolation. Without making a distinction between value creation and value appropriation, it remains unclear whether higher gains for an individual partner can be attributed to a JV which created more value, or to the partner's ability to appropriate a larger share of the total value created at the expense of its partners. Again, several studies in the M&A literature have shown that the distribution of wealth is driven by different factors than those which influence the total amount of value that is created in a deal (e.g., Seth, 1990a; Seth, Song and Pettit,

2000, 2002; Cuypers, Cuypers and Martin, 2009). In particular, prior M&A experience appears to influence value creation and value appropriation differently (Cuypers, Cuypers and Martin, 2009). To address these issues, we look at each of the JV partners' prior JV experience and how this influences the total value that is created through a JV and then the value that a single partner appropriates.

Experience can help firms deal with many of the challenges associated with entering into a JV. In order to realize the potential benefits of JVs, firms have to initiate cooperation, coordinate activities, overcome operational difficulties, resolve conflict, realize potential synergies and deal with unanticipated contingencies among other things in an adequate way (Kogut, 1988; Pisano, 1989; Lane and Beamish, 1990; Park and Ungson, 1997; Pangakar, 2003). These significant challenges require effective management by each of the parties involved in the JV (Ireland, Hitt and Vaidyanat, 2002). The JV literature has established that partners learn to manage their JVs more effectively by transferring their experiences from one JV to subsequent JVs (Barkema and Schijven, 2008). Anand and Khanna (2000) found that firms develop an alliance capability as their experience with doing alliances accumulates. Such a capability can be seen as a firm's ability to manage the different phases or aspects of alliances, communicate and interact with its partners, and to anticipate and respond to unforeseen contingencies (Anand and Khanna, 2000; Kale and Singh, 2007). Hence, an alliance capability enables them to handle more adequately the unique challenges inherent to interfirm cooperation. Pangarkar (2003) found evidence that firms learn to manage alliances and generate synergies through the pooling of resources. Prior experience also enables the development of relational assets which have shown to be positively related to superior firm performance (Dyer, 1997). Finally, Wang and Zajac (2007) argued that the combined alliance capability, i.e. the combined previous JV experience of the JV partners, should be considered to understand how much economic benefits can be realized in a JV.

In sum, each partner's prior JV experience allows firms to cooperate and communicate more efficiently. As a result, the JV should generate more value when each of the individual partners enters into the JV with the benefits of greater prior JV experience. Accordingly, we expect:

Hypothesis 1: The combined previous joint venture experience of the partners is positively related to the total value generated upon entering into a joint venture.

Experience Asymmetry

So far, we have looked at the absolute levels of experience. However, the partners' relative experience might also have an impact on how much value is created in JVs. This issue remains largely unexplored in the literature. Nevertheless, numerous scholars have argued that the emergence and maintenance of effective cooperation between JV partners is related to the diversity and symmetry between the partners, i.e. the inter-organizational differences on certain attributes or dimensions. Namely, diversity and asymmetry between JV partners can seriously impede their ability to work effectively together (Parkhe, 1991; Harrigan 1988a)[2]. The main reason for this is that JV partners are more likely to create value when they possess complementary missions, resources capabilities, managerial capabilities and other attributes that create a strategic fit such that they will require few mutual adjustments to sustain collaborative effectiveness and reduce the costs of coordination (Whetten, 1981; Harrigan, 1985; Parkhe, 1991).

Empirically, evidence has been found of a negative relationship between JV partner asymmetry and JV performance on a wide range of dimensions. For example, Parkhe (1991, 1993) found evidence that differences in partner nationality and culture negatively affect the

[2] It has to be noted than in some cases symmetry may also be detrimental for collaboration. For example, business or product relatedness may increase the probability of unwanted transfers of intellectual property or of other forms of opportunistic behavior which negatively influence cooperation (e.g., Hennart, 1988).

success of alliances. Barkema, Shenkar, Bell and Vermeulen (1997) found similar effects of cultural distance on JV survival. Others have focused on variations in corporate, rather than national, culture between JV partners and have also found a negative relationship between asymmetry and performance (e.g., Killing, 1982). Harrigan (1988a) observed that asymmetries in terms of strategic direction are negatively related to JV performance. Shenkar and Zeira (1992) found that role conflict and ambiguity increase as the partners in a JV differ more. Finally, Gulati and Wang (2003) found that similarity in the core businesses of the JV partners contributes positively to JV performance.

If we extend this logic to prior JV experience, we expect symmetric levels of experience to be beneficial and lead to more value creation. The importance of symmetry in the levels of experience of JV partners has been suggested by Harrigan (1985, 1988a) who found that experience symmetry is positively related to JV duration.

As discussed above, prior experience leads to the creation of an alliance capability which allow for better management of the JV (e.g., Anand and Khanna, 2000). However, one partner having experience is not sufficient for successful cooperation. Each of the partners also has to be able to understand the other (Lane, Salk and Lyles, 2001). Prior JV experience and alliance capabilities are not distributed evenly across firms (Ireland, Hitt and Vaidyanath, 2002). Accordingly, partners which differ more in their levels of prior experience will also differ more in their ability to manage the various phases or aspects of alliances, and to anticipate and respond to unforeseen contingencies (Anand and Khanna, 2000; Kale and Singh, 2007). Such differences influence communication and co-ordination and increase the probability that misunderstandings and misinformation arises. The danger of misunderstanding and misinformation is that they detract significantly from the joint effectiveness of collaboration, unless considerable amounts of costly resources are dedicated to developing mutual understanding (Buckley and Casson, 1992). Likewise, Parkhe (1991)

argued that partners with less similar capabilities require relatively more mutual adjustment to be able to cooperate effectively. More specifically, JV partners with different experience levels will be less able to understand each other's goals and priorities, communicate effectively, coordinate activities, and avoid or resolve conflict.

The literature that has looked at collaboration at a more micro level provides similar arguments. Namely, several studies have shown that diversity in groups, in terms of team members' levels of prior experiences, skills, abilities, etc, increases the likelihood of conflict and miscommunication, and requires additional coordination efforts for collaboration (e.g., Jackson, 1996; Pelled, Eisenhardt and Xin, 1999). Hence, these studies also suggest that large differences in prior experience will hamper collaboration.

As a result, we expect that the JV would benefit less when the partners have a more asymmetric level of prior JV experience. Accordingly, we hypothesize:

> *Hypothesis 2: Asymmetry in the levels of the joint venture partners' prior joint venture experience will be negatively related to the total value generated upon entering into a joint venture.*

Moderating the Effect of Experience Asymmetry

Several factors might influence the negative relationship between experience asymmetry and the amount of value that is created in a joint venture. As discussed above, asymmetric levels of prior JV experience will make cooperation more difficult because the JVs partners' routines and capabilities enabling them to manage the alliance will be less similar. We expect that in those JVs in which more intense cooperation is required, the problems resulting from asymmetric prior JV experience will be more profound. Hence, experience asymmetry should have a stronger negative impact on the total amount of value that is created through the JV in those circumstances. We will look at four specific factors

that may moderate the asymmetry-performance relationship, namely (1) the distribution of the JV's ownership, (2) the scope of the activities of the JVs, (3) the cultural distance between the JV partners, and (4) the level of economic uncertainty surrounding the JV. We will now discuss each of these factors in detail and derive four hypotheses:

Ownership Distribution: The issue of the way equity is distributed among the JV partners has been particularly important in the JV literature (Beamish and Banks, 1987). In general, ownership is seen as a primary mechanism of control (e.g., Anderson and Gatignon, 1986). Furthermore, several studies have linked the internal structure of JVs to how the JV partners interact with each other. JVs can be split in two broad categories based on the distribution of their equity. On the one hand, there are JVs with balanced ownership in which each of the partners has a similar level of equity. This results in shared control of the JV. On the other hand, the ownership distribution in a JV can be unbalanced with one dominant partner having control over the JV (Gatingon and Anderson, 1988; Makino and Beamish, 1998).

Having absolute control in a JV simplifies decision-making and lowers the potential for conflict (Killing, 1983). Furthermore, decision-making in a JV becomes more complex and cumbersome when the partners are equally involved in the daily running of the JV as is the case in balanced JVs (Killing, 1980; Shenkar and Zeira, 1992). Shared decision-making will also require additional coordination (Stopford and Wells, 1972; Killing, 1983).

The increased levels of interaction between JV partners in balanced JVs should not necessarily lead to additional problems. When both partners have similar routines and capabilities, they should be able to cooperate without noteworthy problems. However, when their routines and capabilities differ significantly, as is more likely to be the case when their prior JV experience differs, balanced ownership might cause additional problems. Hence,

balanced ownership will increase the challenges resulting from asymmetric prior JV experience. As a result, we predict:

Hypothesis 3: A more unbalanced ownership structure will reduce the negative relationship between experience asymmetry and the total value generated upon entering into a joint venture.

Joint Venture Scope: JVs differ in their scope, i.e. the extent to which their partners combine functions and activities within the JV (Oxley and Sampson, 2004). For example, JVs can perform manufacturing, marketing, R&D, service activities or any combinations of these. An increase in the scope of a JV increases the interdependence, complexity and uncertainty of collaborating (Oxley and Sampson, 2004; Reuer, Zollo and Singh, 2002). Thus, we expect the need for additional coordination and interaction to be higher in JVs with a broader scope. This will make some of the problems that arise from asymmetric levels of prior JV experience more severe. Hence, we expect:

Hypothesis 4: A wider scope of joint venture activities will strengthen the negative relationship between experience asymmetry and the total value generated upon entering into a joint venture.

Cultural Distance: When an organization expands abroad it will be confronted with an environment that is culturally different from that in its home country. The success of the foreign venture will depend on the cooperation and communication with local parties who tend to have different values, beliefs, and customs (Hofstede, 2001). Lack of knowledge of the local culture can have serious negative effects on the investment (Barkema, Bell and

Pennings, 1996). With increased cultural distance the partners face increased communication problems, are more likely to have different goals, and are more likely to have a more negative attitude towards each other (Weber, Shenkar and Raveh, 1996). While such cultural differences indeed represent severe challenges for the firm initiating expansion abroad and for the local firm, they can be resolved by increased interaction and communication between the JV partners. Thus, the ability to communicate and interact with each other becomes even more important in cross-cultural JVs than in domestic partnerships. As we argued in hypothesis 2, effective cooperation between JV partners is already hampered when they have asymmetric levels of prior JV experience. However, the additional need for cooperation as a result of a greater cultural distance will amplify the issues resulting from experience asymmetry. Therefore, we expect:

Hypothesis 5: Cultural distance will strengthen the negative relationship between experience asymmetry and the total value generated upon entering into a joint venture.

Economic Uncertainty: An important host country factor that has an impact on the value of an investment is economic uncertainty. This refers to the uncertainty about the macroeconomic situation in a host country and encompasses all the unknowns about the level of economic activity and prices (Oxelheim and Wihlborg, 1987). More economic uncertainty results in higher variability in the investor's cash flows and in the value of the investment and the conditions surrounding the investment. As a result, it will lead to a higher likelihood of renegotiation of the JV terms and will require additional coordination between the partners to adjust to the changing circumstances (Reuer and Ariño, 2002). The additional need for joint adjustments as a result of higher economic uncertainty will amplify difficulties of cooperating resulting from experience asymmetry. Hence, we expect:

Hypothesis 6: A higher level of economic uncertainty surrounding the joint venture will strengthen the negative relationship between experience asymmetry and the total value generated upon entering into a joint venture.

The Distribution of the Value Created

So far we have argued that combined JV experience and experience symmetry will have a positive effect on the total value created from the deal, and that the latter effect will be contingent on alliance and environmental circumstances. However, this does not necessarily mean that all the partners involved in the JV benefit from experience, or that they all benefit to the same extent. The total value that is created via a JV has to be distributed between the JV partners.

Although research has shown that JVs create value for the partners on average (e.g., McConnell and Nantell, 1985), several studies also indicated that there is significant heterogeneity in the outcomes of JVs for each of the JV partners. For example, McConnell and Nantell (1985) found that around 33% of all JV partners earned negative returns, while Gulati and Wang (2003) observed a portion of 46% with negative returns. Furthermore, Kumar (2007, 2010) found evidence of asymmetric wealth gains and wealth transfers between JV partners.

The immediate outcome of the deal is largely determined by *ex ante* negotiations between the parties involved (Rao and Schmidt, 1998). Negotiations are a crucial part of creating JV deals, as firms that want to cooperate have to decide on a number of issues - such as the duties and obligations of the partners, mechanisms to make future changes in the terms of the JV, mechanisms to dispute resolution, and the division of profits (Campbell and Reuer, 2001). However, negotiations are not only crucial *ex ante* when the JV is formed, but also

when the terms of the JV are renegotiated over the life of the JV (Reuer, Zollo and Singh, 2002). Rao and Schmidt (1998) emphasized the importance of taking into account the attributes of *both* parties as well as the transaction between them, when studying the JV negotiation and its outcome. Hence, in order to get more insight into the way the value created in a JV is distributed between the partners it is important to understand how the experience of both parties affects the negotiation process and its outcome.

As discussed above, prior collaborative experience allows for the development of partnering skills which subsequently allow firms to collaborate in a more effective manner (Anand and Khanna, 2000). More specifically, higher levels of collaborative prior experience result in improvements in a firm's JV *negotiation skills*, the design of a JV, and the post-formation management (Kale and Singh, 2007). Where there is significant heterogeneity in firms' levels of prior JV experience and thereby in their partnering skills, these interfirm differences explain why some firms get more value out of their JVs (Anand and Khanna, 2000). Similarly, Ireland, Hitt and Vaidynath (2002) argued that the *asymmetric distribution* of alliance capabilities, which result from a firm's prior alliance experience, within an industry allows certain firms to exploit these capabilities as a source of competitive advantage over other firms in their industry. Although Anand and Khanna (2000) and Ireland, Hitt and Vaidyanath (2002) did not explicitly refer to asymmetry in the levels of experience and alliance capabilities within an alliance, the logic that firms can exploit this asymmetry should also apply within alliances and JVs, particularly so because prior collaborative experience also results in improvements in JV negotiation skills (Kale and Singh, 2007). This suggests that firms with relatively more prior JV experience in a JV will be at a negotiating advantage over their less experienced partner, and thereby will be able to capture more value.

The importance of the partners' relative JV experience in determining who will capture the value created in the deal is further supported by findings from the negotiation,

game theory and experimental economics literatures (e.g., Thompson, 1990; Fudenberg and Levine, 1998). Research has shown that the distribution of outcomes of negotiations is influenced by the asymmetries in experience of the negotiating parties. Through experience negotiators learn strategies and skills, thus developing a capability they can use in future negotiations. These skills or strategies will be especially valuable to the negotiator in situations where their counterparty has not developed similar skills or capabilities. More precisely, Thompson (1990) showed that more experienced parties find themselves at an advantage over less experienced negotiators as the former are better able to accurately represent their opponent's priorities and behavior. As a result, asymmetric experience allows the more experienced party in the negotiations to capture more value.

Similarly, research in game theory and experimental economics has looked at the role of experience in a number of other situations involving strategic interaction. In line with Thompson's findings, studies in these areas found that adaptive learning takes place and can be carried over to future games. This again allows more experienced players to capture more value as they are better able to anticipate the behavior of their opponent and subsequently adjust their own strategy based on this information and the feedback of previous games (e.g., Cooper, Garvin and Kagel, 1997; Fudenberg and Levine, 1998). In short, experience asymmetries influence the outcomes of a wide variety of situations involving strategic interaction - including but not limited to negotiations- and the behavior of the players involved. Thus:

> *Hypothesis 7: The more experience a focal firm has relative to its partner, the more likely the focal firm will be to capture more value from the joint venture than its partner.*

METHODS

Sample

Testing the above hypotheses requires a sample of JVs in which the performance of both partners can be measured and compared. We obtained such a sample from Thomson Financial's Security Data Corporation (SDC) database. This database has been used frequently in previous studies as it offers detailed information on firms' investment activities, especially JVs (e.g., Reuer, Park and Zollo, 2002). For the purpose of this study we obtained data from SDC on JVs between two firms that are listed on one of the eight largest stock exchanges in terms of market capitalization.[3] We opted to look at JVs between firms listed on these stock exchanges to ensure a sample of well-documented JVs with substantive but varying levels of prior JV experience. Furthermore, focusing on these stock exchanges with large trading volumes ensures that differences in the amount of value created by either partner are not attributable solely to differences across stock exchanges. After verifying the data – in particular the JV announcement date – using alternative sources such as Lexis-Nexis, we found that SDC provided complete and accurate information on the announcements of 576 matching pairs of parents of JVs established between 1985 and 2006. Subsequently, we collected stock market data from Thomson Financial's Datastream database in order to be able to calculate stock market returns and the amount of value generated for each parent upon JV announcement.

Dependent Variable

To calculate our dependent variables we follow the procedure initially developed by Berkovitch and Narayanan (1993) and since used several times in the strategy and

[3] The eight largest stock exchanges in terms of market capitalization during the period of our sample are the New York Stock Exchange, the Tokyo Stock Exchange, the NASDAQ, the London Stock Exchange, the Hong Kong Stock Exchange, the Toronto Stock Exchange, the Frankfurt Stock Exchange, Euronext, and the Madrid Stock Exchange.

international business literature (e.g., Seth, Song and Pettit, 2000; Seth, Song and Pettit, 2002).

Firstly, we use event study methodology to calculate the abnormal returns of both JV partners after the announcement of the JV. This methodology has been widely used in the finance and strategic management literature as it is particularly suited to capture the value implications of firms' investment decisions (e.g., Park, 2004; Anand and Khanna, 2000; Kale, Dyer and Singh, 2002). More specifically, we calculate cumulative abnormal returns (CARs) using the market model with a 250-day estimation window and a 5-day event window centered around the event date. Both windows are consistent with prior studies which looked at the value implications of JVs (Cunha, 2005). We also check the robustness of our results to different specifications, including shorter event windows (up to the narrowest two-day windows).

The use of abnormal returns to measure value creation and value distribution are suitable for our purpose for several reasons. Firstly, the abnormal returns from event studies allow us to capture all performance implications of a JV as they can be anticipated in a near-instantaneous measurement window (e.g., Fama, Fisher, Jensen and Roll, 1969; Campbell, Lo and MacKinlay, 1997). Such an instantaneous measurement window is crucial for our purpose as we look at the value created and captured by both partners which requires comparable measures for each partner. Accounting measures such as ROA are not readily available to measure the performance implications of an individual JV and are subject to differences in accounting standards across countries. Secondly, studies have found that abnormal returns are strongly correlated with other performance measures where the latter are available. For example, Koh and Venkatram (1991) and Kale, Dyer and Singh (2002) found a high and positive correlation between abnormal returns and managerial assessments of alliance performance.

The CARs, as expressed in percentage terms, cannot simply be combined to calculate the total value that is created upon the announcement of the JV (hypotheses 1-6), nor can they be used to compare the value captured by each of the partners (hypothesis 7). The reason is that there might be size differences between partners: All else equal, a JV will have a smaller % impact on the value of a large firm than on that of a smaller firm. This can be resolved by using absolute amounts of the value created in U.S. dollars, rather than relative returns expressed as percentages (Berkovitch and Narayanan, 1993; Seth, Song and Pettit, 2000; Seth, Song and Pettit, 2002).

Therefore, in a second step, we calculate the total value associated with the announcement of the JV in absolute terms. This equals the sum of the dollar values accruing in U.S. dollars to both parties. The value created by each of the partners can be calculated by multiplying the individual partner's pre-announcement market value by its CARs during the event window. Hence, the total value created associated with the announcement of the JV can be expressed as (Berkovitch and Narayanan, 1993; Seth, Song and Pettit, 2000):

$$\text{Total Value Created} = \text{Value Created}_{\text{A}} + \text{Value Created}_{\text{B}} = S_{-3}^{\text{A}} P_{-3}^{\text{A}} \sum_{i=-2}^{i=2} AR_i^{\text{A}} + S_{-3}^{\text{B}} P_{-3}^{\text{B}} \sum_{i=-2}^{i=2} AR_i^{\text{B}}$$

where,

A and B are the two partners in the JV,

S_{-3} is the number of shares on day -3,

P_{-3} is the share price on day -3,

$\sum_{i=-2}^{i=2} AR_i$ are the cumulative abnormal returns during the [-2,2] event window.

When structuring our data to test hypotheses 1 through 7 we had to decide who we allocated as partner (A) and partner (B) respectively. We opted to structure our sample in such a way that partner A is the partner with the highest level of prior JV experience of the two partners. Compared to a more random allocation, this facilitates the interpretation of our results.

Testing hypothesis 7 is complicated substantially by the fact that at least one of the partners in a given JV deal may have negative returns upon announcement – as indeed is common (Koh and Venkatraman, 1991; Kumar, 2007; Kumar, 2010). In these cases, dependent variables such as the ratio or difference between both partners' returns, have no straightforward interpretation. Therefore, we opted to use a dependent variable which is not subject to these problems. More specifically, we calculated a dummy variable that takes the value 1 if $\text{Value Created}_{A} > \text{Value Created}_{B}$, and zero otherwise.

Independent Variables

Prior JV Experience (H1): We measure the firms' prior JV experience as the total number of JVs that both firms have been involved in during the 15-year period preceding the focal JV (Wang and Zajac, 2007). The results are robust to the use of alternative periods. Furthermore, our results are very similar when we use an experience measure that has been log-transformed.

Experience Asymmetry (H2): We measure experience asymmetry as the difference between each partner's number of prior JVs. More specifically, we subtract the number of prior JVs of partner (B) from the number of prior JVs of partner (A).

Unbalanced Ownership (H3): We measure the imbalance in the ownership distribution of the JV using the following equation:

$$\text{Unbalanced Ownership} = \left|\text{Equity stake}_{\text{Partner A}} - 50\right|$$

A higher score on this value implies a more unbalanced ownership distribution while a score of zero means that the two JV partners have equal equity shares.

JV Scope (H4): Similar to several other studies (e.g., Reuer, Zollo and Singh, 2002), we measure the degree of scope in the activities of a JV using a count measure which captures the number of activities performed in the JV. This count measure increases with each of the following activities that are conducted in the JV: manufacturing, marketing, services, and R&D.

Cultural Distance (H5): We measure cultural distance by using Kogut and Singh's (1988) cultural distance index. This oft-used index is based on the difference between each of the partners' home countries along Hofstede's (2001) four initial cultural dimensions. A higher score on Kogut and Singh's (1988) index implies greater cultural distance.

Economic Uncertainty (H6): The degree of economic uncertainty is measured using the *Euromoney* country risk index. This oft-used index (e.g., Oxley, 1999) measures the economic uncertainty of a country at a particular time on a scale from 0 to 100 based on three types of indicators, namely credit indicators (e.g., payment records), analytical indicators (e.g., economic performance forecasts), and market indicators (e.g., selldown performance). The index comprises a mix of market perception and objective measures.

Control Variables: When testing for the total value created, we control for a number of additional factors. Firstly, we control for the relatedness between both JV partners with a dummy variable which equals one when both parties are active in the same 4-digit SIC code (Koh and Venkatraman, 1991; Oxley and Sampson, 2004). We also control for the combined size of both firms measured as the sum of their respective market value before the JV announcement. Finally, we include fixed effects for each year in which the JVs were

announced[4]. For the models that look at value distribution we use the same controls or we take the equivalent partner level measures. Namely, we control for partner size differences, i.e. the difference between the pre-announcement market value of both partners instead of combined size. Furthermore, we control for the equity stake a partner has in the JV.

Estimation

We use ordinary least squares regression to test hypotheses 1 though 6. In hypothesis 7 we are interested in the value distribution between the JV partners. To test hypothesis 7, we use a Logit regression which accommodates for a binary dependent variable. The general formulation of such a model is (Greene, 2003):

$$Log\left\{\frac{P(Y_i=1)}{1-P(Y_i=1)}\right\} = B(X_i)\ ,$$

where $P(Y_i=1)$ is the probability a focal firm captures more value than its partner, and X_i is the vector of all explanatory variables.

RESULTS

Descriptive Statistics

Descriptive statistics and pairwise correlations can be found in Table 1. Table 1 shows that the mean total value created (combining both parties absolute returns in $ terms) is approximately $50 million. The value created by the individual partners is on average about $25 million. Hence, on average JVs are creating value but approximately 47% of all JV partners earn negative returns. These results are in line with recent research (e.g., Kumar, 2007; Kumar, 2010). They are also robust to alternative event windows.

[4] In order to check the robustness of our results, we also ran our models using fixed effects for the industry in which the JV was active rather than year effects. The results were consistent with those reported below.

TABLE 1: Descriptive Statistics and Correlations

	Variable	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8	9
1	**Total Value Created (m$)**	49.69	449.66	-2740.41	3504.11	1.00								
2	**Partner Relatedness**	0.17	0.38	0.00	1.00	0.06	1.00							
3	**Combined Parent Size (m$)**	14626.36	28738.52	55.49	308910.90	0.37	0.04	1.00						
4	**Unbalanced Ownership**	5.60	10.74	0.00	50.00	0.19	0.08	0.00	1.00					
5	**JV Scope**	1.67	0.74	1.00	4.00	0.01	-0.11	0.04	0.06	1.00				
6	**Cultural Distance**	0.92	1.29	0.00	8.12	-0.01	0.03	0.10	0.02	0.19	1.00			
7	**Economic Uncertainty**	9.71	10.55	0.00	64.90	-0.09	0.11	0.06	0.06	-0.16	0.04	1.00		
8	**Total JV Experience**	13.56	24.16	0.00	254.00	0.24	0.05	0.51	0.03	0.12	0.14	0.07	1.00	
9	**JV Experience Asymmetry**	7.93	15.09	0.00	139.00	0.03	-0.06	0.19	0.01	0.10	0.13	0.00	0.74	1.00

Table 1 also shows that both JV partners combined have on average been involved in nearly 14 JVs before the focal JV. This comes down to about 6.8 prior JVs for each individual partner. The correlations do not suggest that collinearity might be a problem, and a variance inflation factor (VIF) analysis confirms this.

Value Creation

The results of the models to test hypotheses 1 through 6 are reported in Table 2. After including only our control variables in Model 1, we add both partners' prior JV experience in and the level of experience asymmetry between partners in Model 2. Subsequently, we introduce each of the individual interaction terms in Models 3 through 6. Finally, we include all the interaction terms simultaneously in Model 7. The F-statistics show that every model is significant relative to an intercept-only model.

Among the control variables, combined parents size, unbalanced ownership and economic uncertainty are significant ($p<.001$). Hence, the larger the combined size of the JV partners, the more value is created. Furthermore, we find that the more unbalanced the ownership distribution between both partners the more total value is created through the JV. The positive effect of unbalanced ownership is consistent with the literature that has argued that unbalanced ownership makes it easier to make decisions and reduces the potential for conflict, thus resulting in more stable and long-lived JVs (e.g., Killing, 1983). Higher levels of economic uncertainty seem to result in less value creation. This is consistent with Merchant and Schendel (2000).

The results of Model 2 are consistent with hypothesis 1. Namely, we find a positive and significant relationship ($p<.001$) between the cumulative prior JV experience of both JV partners and the total amount of value that is generated through a JV. Similarly, we find in Model 2 that the experience asymmetry is negatively and significantly ($p<.001$) related to the total value generated upon entering in a JV. This supports hypothesis 2. In Model 3, we

TABLE 2: Combined Value Created: OLS Results

	Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Constant	5.631		28.416		43.348		-27.116		22.305		-27.064		-93.120	
		(52.262)		*(52.276)*		*(51.891)*		*(57.712)*		*(52.307)*		*(53.029)*		*(58.735)*	
	Partner Relatedness	56.336		30.596		25.284		35.151		37.898		34.852		45.886	
		(47.247)		*(47.308)*		*(46.831)*		*(47.181)*		*(47.419)*		*(46.572)*		*(46.025)*	
	Combined Parent Size (m$)	0.006	***	0.004	***	0.004	***	0.004	***	0.004	***	0.004	***	0.004	***
		(0.001)		*(0.001)*		*(0.001)*		*(0.001)*		*(0.001)*		*(0.001)*		*(0.001)*	
	Unbalanced Ownership	8.011	***	8.061	***	4.909	**	7.861	***	8.076	***	7.695	***	4.589	*
		(1.669)		*(1.653)*		*(1.858)*		*(1.649)*		*(1.650)*		*(1.629)*		*(1.818)*	
	JV Scope	-12.639		-19.927		-14.614		16.141		-28.454		-11.970		25.021	
		(25.618)		*(25.466)*		*(25.240)*		*(30.073)*		*(25.907)*		*(25.131)*		*(29.277)*	
	Cultural Distance	-15.232		-12.975		-10.724		-16.973		1.966		-14.983		2.619	
		(14.105)		*(14.087)*		*(13.952)*		*(14.149)*		*(16.561*		*(13.872)*		*(16.022)*	
	Economic Uncertainty	-6.005	***	-6.360	***	-6.068	***	-6.268	***	-6.570	***	-1.054		-0.524	
		(1.764)		*(1.748)*		*(1.731)*		*(1.742)*		*(1.749*		*(2.113)*		*(2.077)*	
H1	**Total JV Experience**			4.767	***	4.625	***	4.813	***	4.780	***	5.029	***	4.995	***
				(1.337)		*(1.323)*		*(1.332)*		*(1.334)*		*(1.317)*		*(1.293)*	
H2	**JV Experience Asymmetry**			-6.209	***	-10.251	***	0.842		-2.732		-0.894		9.118	†
				(1.829)		*(2.134)*		*(3.644)*		*(2.735)*		*(2.180)*		*(4.962)*	
H3	**JV Experience Asymmetry x Unbalanced Ownership**					0.469	***							0.425	***
						(0.131)								*(0.129)*	
H4	**JV Experience Asymmetry x JV Scope**							-4.168	*					-4.995	**
								(1.866)						*(1.856)*	
H5	**JV Experience Asymmetry x Cultural Distance**									-1.817	†			-2.496	*
										(1.064)				*(1.064)*	
H6	**JV Experience Asymmetry x Economic Uncertainty**											-0.686	***	-0.743	***
												(0.159)		*(0.157)*	
	Nobs	576		576		576		576		576		576		576	
	R^2	0.188		0.208		0.225		0.215		0.211		0.231		0.263	
	F-statistic	19.57	***	16.73	***	16.61	***	12.81	***	15.25	***	17.43	***	15.62	***

All models include year fixed effects. Standard errors are in parentheses. All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

include the interaction between experience asymmetry and unbalanced ownership. As predicted in hypothesis 3, the interaction between these two variables is positive and statistically significant ($p<.01$). The results in Model 5, 6 and 7, are consistent with hypotheses 4, 5 and 6. Namely, we find negative and significant relationships ($p<.05$) between the interaction of experience asymmetry and JV scope and the amount of value that is created. Similarly, we find that the interaction between experience asymmetry and cultural distance ($p<.10$), and the interaction between experience asymmetry and economic uncertainty ($p<.001$) are both negative and significant. Finally, Model 8 includes measure of all interaction terms simultaneously. This does not substantively change the results, though the significance of the interaction between experience asymmetry and JV scope ($p<.01$), and the interaction between experience and cultural distance ($p<.05$) are higher.

An examination of the practical magnitudes of the hypothesized effects confirms the statistically significant results. A JV where the partners have one additional JV's worth of experience will generate almost an additional $5 million in value. Similarly, one extra JV of experience asymmetry between both JV partners will destroy about $6 million.

To facilitate the interpretation of our findings and their economic magnitude, we have plotted the effects of our four interaction terms on total value created in Figures 1a-1d. following the procedures recommended by Aiken and West (1991). More specifically, we plotted the relationship between experience asymmetry and the amount of value that is created through a JV over the entire observed range of experience asymmetry, with separate lines representing different levels of unbalanced ownership (Figure 1a), JV scope (Figure 1b), cultural distance (Figure 1c), and economic uncertainty (Figure 1d), respectively. The plotted lines represent the expected amount of value created on the basis of the unstandardized regression coefficients from each of the respective models with an individual interaction term. Furthermore, the low unbalanced ownership, JV scope, cultural distance, and economic

FIGURE 1: Interaction Effects

FIGURE 1a: Conditional Effect of Unbalanced Ownership on Value Creation

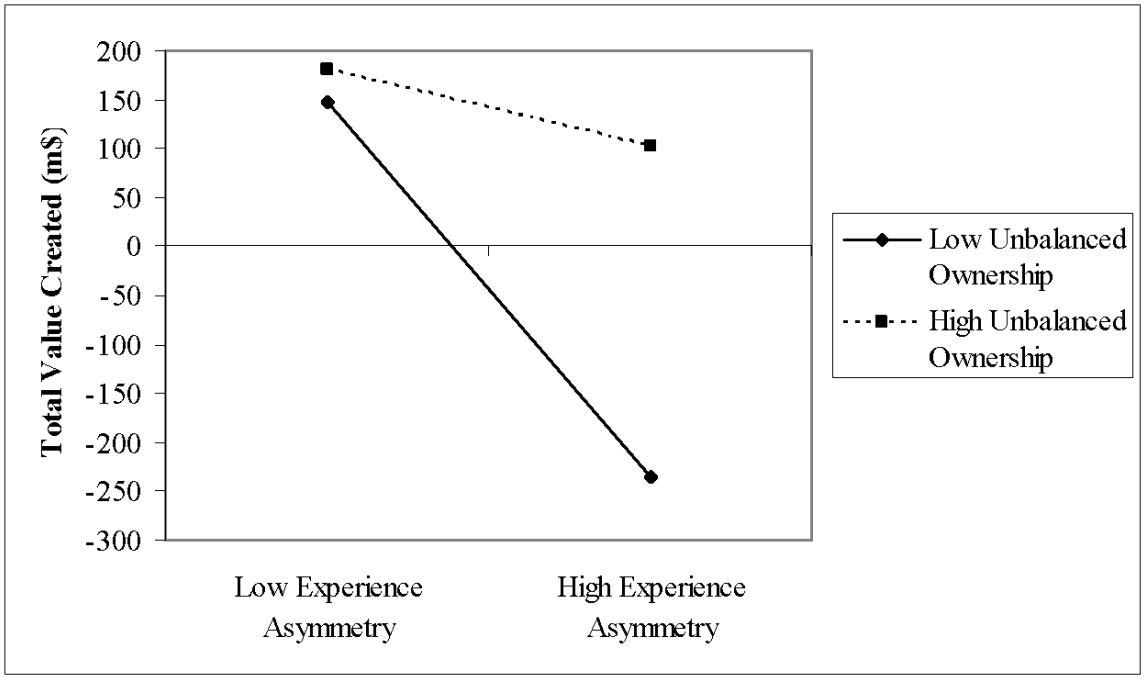


FIGURE 1b: Conditional Effect of JV Scope on Value Creation

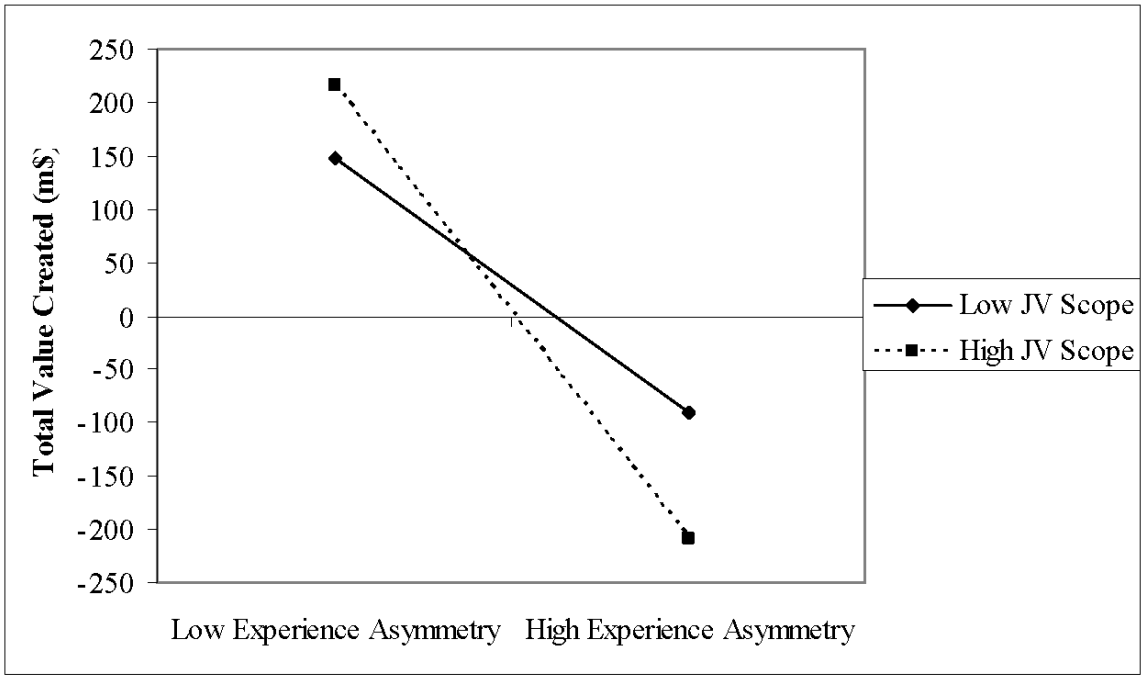


FIGURE 1c: Conditional Effect of Cultural Distance on Value Creation

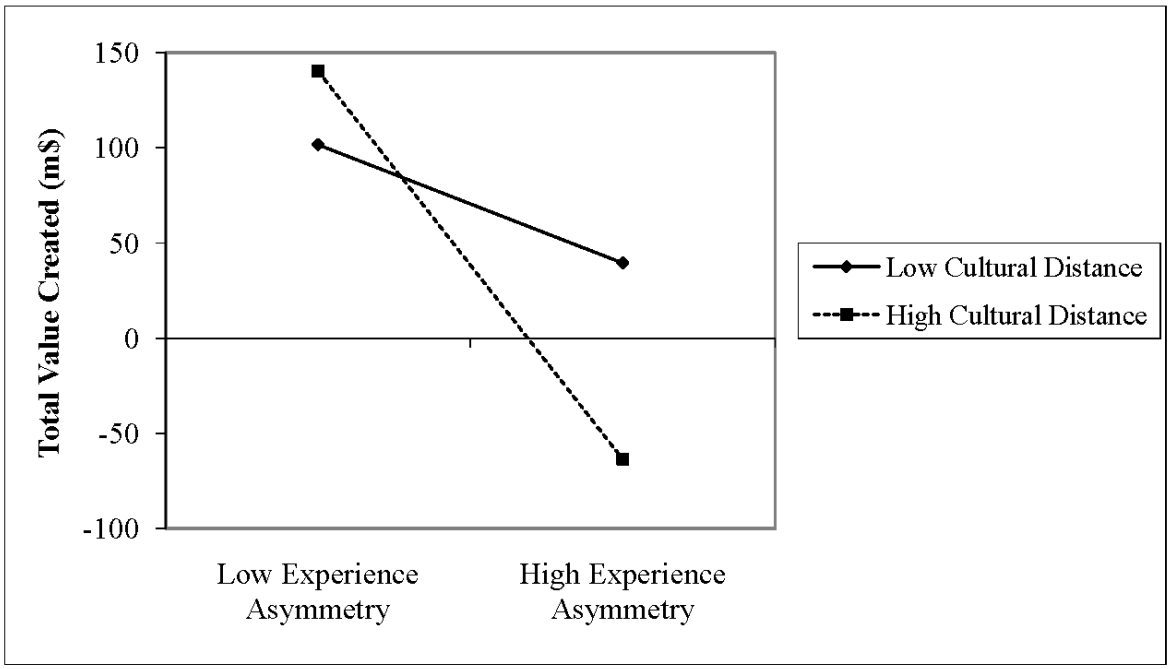
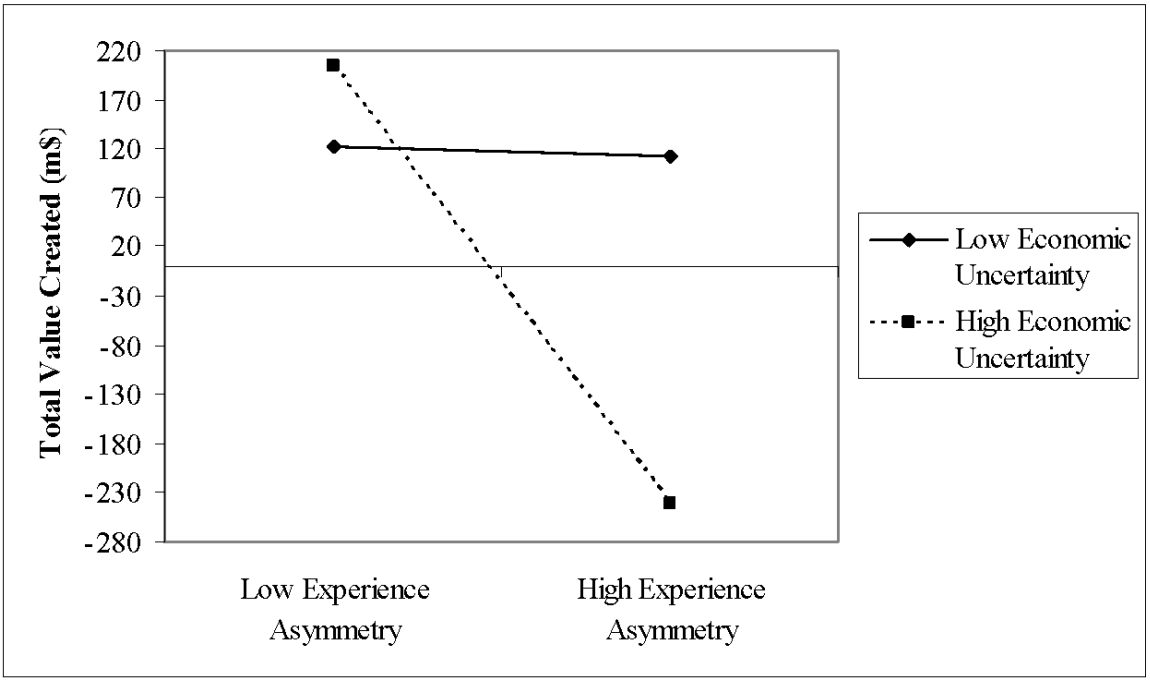


FIGURE 1d: Conditional Effect of Economic Uncertainty on Value Creation



uncertainty lines represent values of one standard deviation below the mean of these variables while the high unbalanced ownership, JV scope, cultural distance, and economic uncertainty value lines represent values of one standard deviation above the mean. Figure 1 graphically

supports our hypotheses 2, 3, 4 and 5 and indicate that our results have a substantial economic impact of the total value that is created in JVs.

The Distribution of the Value Created between the JV Partners

In hypothesis 7 we argue that the distribution of the total value created by the JV between both partners will depend on the level of asymmetry in their respective prior JV experience. To test our hypothesis we use a dependent variable which equals 1 when partner A captures more value than partner B, and zero otherwise.

The Logit results to test hypothesis 7 are reported in Table 3. Model 8 represents a baseline model including all control variables, while Model 9 includes our experience variables. The coefficients of the control variables remain stable when experience asymmetry is added to the model though none significant are except partner relatedness ($p<.05$) in either model.

In model 9 we find a positive and significant ($p<.01$) relationship between the level of experience asymmetry and our dependent variable. Hence, the more experience a focal firm has compared to its partner, the more likely the focal firm will be the partner who captures most of the value that is created in the JV. This is consistent with our hypothesis 7. Practically, a firm whose experience exceeds that of its partner by an additional standard deviation's worth of JV experience will see its probability to be the partner that captures most value increase by over 30%. Hence, our results are both statistically and practically significant.

Overall, we can conclude that the level of experience asymmetry does not only play a role in determining how much value is created through a JV, but also determines how the value that is created is distributed among the JV partners.

TABLE 3: The Distribution of the Value Created between the JV Partners

		Model 8		Model 9	
	Constant	-0.837	*	-0.967	*
		(0.418)		*(0.427)*	
	Partner Relatedness	0.475		0.509	*
		(0.225)		*(0.230)*	
	Firm Size Difference	-1.12E-04		-3.66E-07	
		(2.73E-04)		*(3.98E-06)*	
	Equity Share	0.003		0.004	
		(0.007)		*(0.007)*	
	JV Scope	0.106		0.036	
		(0.120)		*(0.123)*	
	Cultural Distance	0.022		-0.013	
		(0.068)		*(0.070)*	
	Economic Uncertainty	0.007		0.005	
		(0.008)		*(0.008)*	
	Total JV Experience			0.008	
				(0.007)	
H7	**JV Experience Asymmetry**			0.023	*
				(0.012)	
	Nobs	576		576	
	Log Likelihood	-388.746		-376.173	***

All models include year fixed effects. Standard errors are in parentheses. All tests are two tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p<0.001$.

DISCUSSION

In this paper, we sought to increase our understanding of how firms create and capture value in JVs by looking simultaneously at both partners' prior JV experience. This paper provides evidence on the impact of prior JV experience on both value creation and value capturing. More specifically, we find that higher levels of the partners' combined prior JV experience increase the total value that is created through JVs (hypothesis 1). Furthermore, we find that what matters is not only absolute levels of experience matter; it also matters whether or not the partners' prior JV experience levels are asymmetric (hypothesis 2). JVs

create substantially less values when they are formed between partners whose prior experience levels differ considerably from each other. However, our results also suggest that the negative impact of experience asymmetry on total value created is contingent on a number of factors both internal and external to the JV. Namely, we find that experience asymmetry is less problematic when the ownership distribution of equity in the JV is more unbalanced (hypothesis 3). We also find that JV scope (hypothesis 4), cultural distance (hypothesis 5), and economic uncertainty (hypothesis 6) strengthen the negative effect of experience asymmetry on total JV value creation. Finally, we demonstrate that the distribution of the total value created by the deal between partners depends on the symmetry in their prior JV experience (hypothesis 7). More specifically, we find that the more experience a focal partner has relative to the other partner, the more likely the focal firm is to be the partner who captures most value from the JV.

Overall, our model and results demonstrate the importance of both partners' experience and the asymmetry between their levels of prior JV experience. We show that experience asymmetry has substantive main effects on the total value created as well as on the distribution of value between both partners upon JV announcement. These effects have been largely ignored in previous research. As a result, this study makes a number of contributions to both the JV and organizational learning literatures.

First, we advance research on JVs by distinguishing between *value creation* and *value capturing* and assessing both simultaneously. Most studies have investigated either the wealth gains of individual partners, or in a few rare cases the total value that is created (e.g., Koh and Venkatraman; 1991). However, without considering value creation and appropriation simultaneously, it remains unclear whether higher gains for individual partners can be attributed to a JV which created more value, or to the partner's ability to appropriate more value at the expense of its partners. This study pushes the JV literature forward by

demonstrating that value creation and value capturing effects are both substantive, and furthermore that these two effects are driven by different factors and mechanisms. In particular, we find that experience asymmetry has opposite effects on value creation and on value appropriation. This shows that this refinement is important as we cannot have an accurate understanding of how firms benefit from cooperation by looking at either value creation or value appropriation in isolation. Our findings reinforce a few prior studies which suggest that firms benefit asymmetrically from interfirm collaboration when JV partners have different abilities and opportunities to extract value from collaborating (e.g., Gulati and Wang, 2003). Furthermore, the JV literature has established that partner fit along several dimensions affects JV success (Shenkar and Zeira, 1992; Geringer, 1991; Luo, 1997; Mowery, Oxley and Silverman, 1996). We contribute to the JV literature by adding an important dimension of fit – that in the prior experience levels of the JV partners.

Second, our study has substantive implications for research on organizational learning as we look not only at the experience effects of individual partners, but also at how asymmetries in prior experience levels matter. Experience asymmetries between ostensibly cooperative firms have been largely overlooked in the learning literature. We offer new insights by showing under what conditions such asymmetries matter, and how they can be a substantial source of value creation and value capturing.

Furthermore, we provide evidence that experiential learning leads to value creation in JVs. Despite the growing body of research in this area, no consensus on the role of experience and learning in collaborative settings has been reached as previous studies yielded mixed empirical results. Previous research has found positive experience effects on JV performance (e.g., Anand and Khanna, 2000), has failed to find such effects (e.g., Barkema, Shenkar, Vermeulen and Bell, 1997) or has found negative effects (e.g., Reuer, Park and Zollo, 2002). We argue that a number of empirical limitations of these studies - specifically

their focus on wealth gains of individual partners and/or the experience of individual partners – are at the basis of some of the confusing results in the literature. After dealing with these issues by looking at both partners' prior JV experience and total value creation, we find convincing evidence in support of a positive relationship between prior JV experience and value creation in subsequent JVs.

Finally, our findings have substantive practical implications for managers of firms looking to enter into JVs. The negative effect of experience asymmetry entails that firms should take this into account when searching for and evaluating a potential partner. However, having a more similar level of previous JV experience will not necessarily lead to the best outcome in terms of capturing more value. Hence, firms face a trade-off in dealing with two opposing effects of experience maximization and asymmetry. This may determine whether maximizing the total value created in a deal also maximizes the amount of value that the focal firm can capture. Managers should deal with the dual role of information asymmetry while incorporating in their decisions that there is a positive effect of the JV partners' absolute levels of prior JV experience on value creation.

Further Research and Conclusion

This study is not without limitations and several suggestions for further research can be made. Firstly, we study JVs between firms listed on the eight largest stock exchanges. Firms listed on these stock exchanges are characterized by high levels JV activity and have been the focus of numerous JV studies, which facilitates comparisons with previous research; however, future studies could fruitfully verify our results in other settings. Secondly, we look at experience in the broadest sense. Further studies could examine the impact of different types of experience. For instance, there may be differences between international and domestic JV experience (Barkema, Shenkar, Vermeulen and Bell, 1997). Likewise, there may be differences between sectors, e.g., high-tech versus low-tech sectors. Furthermore, a

number of recent studies have shown that experience with one corporate development activity can spill over to other activities (e.g., Zollo and Reuer, 2008: Cuypers and Martin, 2008). Whether the effect of these spillovers is negative or positive is largely dependent on the cognitive distance or similarities between the activities (Zollo and Reuer, 2008). Therefore, it would be interesting to investigate how experience with other corporate development activities, such as M&As and non-equity alliances, influences how much value is created in JVs and how this value is distributed between the partners.

Future research could also explore whether firms with more JV experience will be more likely to actively seek potential partners, and whether they prefer more or less experienced partners. A further implication of our results is that the matching of experience levels between JV partners requires attention in future research, as it stands to affect who deals with whom and with what consequences.

Notwithstanding these limitations and remaining research avenues, our study increases the understanding of how firms can improve the likelihood of JV success by paying extra attention to both JV partners' prior experience and to the effects that this will have both on the total value that is created and on how this value is distributed. Given the theory and results developed in this paper, further research in this area is well warranted.

CHAPTER 6

MAIN FINDINGS AND CONTIBUTIONS

During the last decades, we have witnessed an explosion in the number of JVs which has triggered considerable enthusiasm among scholars and practitioners. Numerous studies have contributed to our understanding of specific JV stages – from initial conditions, to JV terms and initial ownership, to subsequent adjustment and post-JV outcomes (sale, dissolution etc.). Nevertheless, we still observe that many JVs do not live up to their expectations.

In the JV literature, two factors in particular, i.e. experience and uncertainty, have received considerable theoretical and empirical attention. Namely, various theoretical perspectives on JVs such as learning, transaction cost and real option theory provide different and sometimes even contradictory predictions about the roles of uncertainty and experience. Simultaneously, empirical studies have yielded mixed results regarding uncertainty and experience. These apparent theoretical contradictions, mixed empirical findings, and the fact that many JVs do not live up to their expectations, warranted further research. In the four essays of this dissertation I have contributed to the JV literature by improving our understanding of the roles of different types of uncertainty and experience on the successive stages in the lifecycle of a JV.

In my second chapter, I provide a comprehensive synthesis and extension of the real option literature on JVs. Firstly, I discuss several major alternative theoretical perspectives on JVs such as learning, bargaining, transaction cost and agency theory. I argue that these theoretical perspectives complement rather than contradict real option predictions when we

use a more precise conceptualization of uncertainty by distinguishing between exogenous and endogenous sources of uncertainty.

Secondly, I compare arguments and variables used to explain different JV stages and highlight research opportunities. I have highlighted the need for integrating the different stages of the JV's life cycle. In doing so, I indicate a number of theoretical gaps and contradictions in the real option literature on JVs. Furthermore, I discuss and provide solutions to a number of empirical problems – the possibility of endogenous-selection biases and omitted variable biases - that may arise from the lack of integration in the existent literature. Finally, I outline several opportunities for future research by incorporating explanatory variables in a particular stage that previously have only been used in the context of another stage.

Thirdly, I look at behavioral effects and how potential decision-making biases might lead to suboptimal investment behavior when making real option (JV) investments. More specifically, I distinguish between objective and perceived uncertainty and build on behavioral-decision theory to illustrate how a number of heuristics influence how managers perceive uncertainty and make real option investment. In doing so, I introduce additional realism in the use of real options, especially JVs. This refinement is all the more relevant as it can inform researchers about how practitioners use or misuse real options in practice.

Overall, chapter 2 demonstrates that real option theory is an important perspective to study JVs for researchers in strategy and practitioners, and opens avenues for further research both in combining real option research with other theories, and in integrating what we know about different JV decisions and stages.

In the third chapter, I examine empirically the boundaries of real option logic by distinguishing between forms of uncertainty which resolve endogenously versus exogenously. My results reveal that when uncertainty resolves exogenously, there is indeed a

negative relationship between economic uncertainty, local institutional uncertainty, and exchange rate uncertainty, respectively, and the foreign share in a JV. Hence, my results are consistent with real option predictions when it comes to exogenous uncertainty. I also examine endogenous sources of uncertainty by looking at the relationship between cultural uncertainty, uncertainty about development capabilities and scope-related uncertainty, respectively, and the foreign share in a JV. Using an appropriate technique to test null hypotheses, I find no support for the statistical relationship that would follow from a real option model.

My findings have important implications for real option theory. I provide a framework that makes it possible to identify under what conditions an investment can truly be expected to represent a real option. In doing so, I advance our understanding of the boundary conditions for real option theory. Namely, my results provide evidence that real option logic is applicable when uncertainty resolves exogenously, but not when it resolves endogenously. Although a wide range of investments has been classified as real option investments and as appealing as using real options metaphorically may be, this should only be done while keeping carefully in mind what sources of uncertainty the option is meant to hedge, and whether the uncertainty resolves endogenously.

The implications of my findings for joint venture research are substantive too. The determinants of the ownership distribution of JVs have received relatively little less attention in the JV literature and have produced comparatively disappointing empirical results. My results confirm that a real option perspective can be useful in modeling equity share decisions in JVs, although I show that this is only true when uncertainty resolves exogenously. Hence, this demonstrates that there is a conditional effect of uncertainty on JV ownership, thus complementing literature about the choice of entry mode. Furthermore, this highlights the

need for and the rewards from a more precise conceptualization of uncertainty in the JV literature.

In the fourth chapter, I look at the evolution of international subsidiaries. More specifically, I provide evidence that firms often have ownership level in their subsidiaries which are misaligned with the levels of uncertainty they face in the external environment. This has important implications for the evolution of these subsidiaries, as I show that firms adapt their ownership levels to reduce the degree of misalignment. Moreover, I observe and explain why some firms adapt their ownership levels faster than others. My arguments and findings make several contributions.

Firstly, I provide evidence of different types of learning – namely, differences between general JV learning and JV adaptation learning, and between vicarious and experiential learning. Secondly, I reveal a complex relationship between a firm's prior experience and the dynamics of subsequent subsidiaries. Namely, my results highlight three different but complementary effects of experience contingent on the type of experience and the stage in the life-cycle of the subsidiary: (1) vicarious learning has a *substituting* effect at formation which reduces the need for post-formation adjustments and thereby results in more stable subsidiaries, (2) experiential learning has a post-formation *facilitating* effect and (3) a experiential learning has a *momentum* effect at formation, which both result in ultimately more unstable subsidiaries. This highlights the importance of differentiating between the source and type of knowledge firms accumulate in their international subsidiaries.

My findings also contribute to the international business and strategy literatures on subsidiary dynamics. Firstly, I show that uncertainty in the external environment is a key determinant of subsidiary dynamics. Firms indeed align their initial ownership levels with the external environment. Secondly, contrary to most previous studies I look at incremental ownership changes during the life of a subsidiary. This offers new insights and reveals that

firms adjust their ownership levels to re-align with the external environment. However, I find that impact of changes in the external environment on ownership misalignment and subsidiary instability is contingent on the direction of the change. While instability is often considered to be an indication of failure, the re-aligning adaptations in the ownership levels of subsidiaries can be considered positive.

In the fifth chapter, I extend research on the link between prior JV experience and the amount and distribution of the value generated by the JV. My results show that the prior JV experiences of each of the JV partners, and the level of asymmetry in their respective JV experience, have an impact on value creation and value appropriation. Namely, higher levels of the partners' combined prior JV experience increase the total value that is created through JVs while asymmetry in the partners' levels of prior JV experience decreases the total value that is created. Furthermore, my results suggest that the negative impact of experience asymmetry on total value created is contingent on a number of factors both internal and external to the JV. Finally, I demonstrate that the distribution of the total value created by the deal between partners depends on the symmetry in their prior JV experience. More specifically, I find that the more experience a focal partner has relative to its partner, the more likely the focal firm is to be the partner who captures most value from the JV.

These findings have important implications for both the JV and learning literatures. Firstly, I further advance research on JVs by distinguishing between *value creation* and *value capturing* and assessing both simultaneously. Because past research typically examined one effect to the exclusion of the other, it remained unclear whether higher gains for individual partners can be attributed to a JV which created more value or to the partner's ability to appropriate more value at the expense of its partners. I demonstrate that value creation and value capture demand different explanations, as for instance experience asymmetry has opposite effects on them.

Secondly, my findings also have substantive implications for research on organizational learning. I do not only look at experience effects of individual partners in isolation, but also at how asymmetries in prior experience levels matter. Experience asymmetries between ostensibly cooperative firms have been largely overlooked in the learning literature. I offer new insights by showing under what conditions such asymmetries matter, and how they can be a substantial source of value creation and value capturing. Furthermore, I provide evidence that experiential learning leads to value creation in JVs.

Overall, besides making a number of individual contributions, the four studies which comprise this dissertation also make a broader contribution to the JV literature by adding to our understanding of how different types of uncertainty and experience influence the different stages of the life-cycle of a JV. In chapter 2, I address this by distinguishing between, respectively, endogenous and exogenous uncertainty, and objective and perceived uncertainty, and by showing how each of these types of uncertainty influence several of the major stages of the life-cycle of a JV. In chapter 3, I build on the distinction between exogenous and endogenous uncertainty and show that only exogenous sources of uncertainty determine the distribution of equity stakes in JVs at formation. Again this highlights that a more accurate conceptualization of uncertainty leads to new insights. In chapter 4, I look at how firms adapt their ownership levels in foreign subsidiaries when they are misaligned with the levels of uncertainty in the environment surrounding the subsidiary. I use the model from chapter 3 to determine the optimal level of ownership for a foreign investor given the levels of exogenous uncertainty surrounding the subsidiary. Furthermore, I show how shifts in the same sources of uncertainty which were of interest in chapter 3 influence subsidiary stability. Finally, in chapter 5, I look at the effects of prior JV experience and experience asymmetry on value creation and appropriation. I also show that several of the sources of uncertainty (scope, economic, and cultural uncertainty), which are also of interest in chapter 3, moderate

the effect of experience asymmetry on value creation regardless of whether they are exogenous or endogenous. All in all, these four essays contribute significantly to our understanding of the role of different types of uncertainty and experience on JV formation, stability and performance.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The essays in this dissertation offer several opportunities for future research. In the second chapter I highlight important research opportunities and provide a number of testable propositions. However, several of these propositions remain untested in this dissertation. Therefore, a promising avenue for future research is the empirical examination of these effects I have not tested yet. A particularly interesting starting point for future research may be the distinction between objective and perceived uncertainty. Overall, the literature on JVs has usually conceptualized and measured uncertainty as being objective. However, in reality managers make their JV decisions based on their subjective perceptions of uncertainty. Therefore, it is important to consider how uncertainty is perceived by managers to explain more accurately how they make and manage their JV investments. This could also help to explain observed deviations from the normative predictions of several theories (e.g. real option, transaction cost, and learning theory).

Secondly, I look at several major stages of the life-cycle of a JV. More specifically, I investigate how uncertainty and experience influence JV formation, stability, and performance. However, some JV aspects remain largely unexplored in this dissertation. For example, it would be interesting to investigate how different types of uncertainty and experience drive JV partner selection. Also, we know relatively little about the consequences of exiting alliances, taking into account the conditions that led to JV exit and the form that the

exit takes. Further research in these areas is all the more justified as these topics have received relatively little attention in the JV literature.

Finally, I only look at one particular type of investments, namely the JV. However, several of the issues I raise and of the theoretical arguments I make should be generalizable at least to some extent to other types of investments. For example, the distinction I make in chapter 5 between value creation and value appropriation should also be relevant in an M&A context. This distinction should also be crucial to understanding the outcomes of M&As. Yet, it remains largely unexplored in the M&A literature. Future research could therefore investigate whether distinguishing between value creation and value appropriation mechanisms sheds light the conditions under which acquirers and/or targets benefit from M&As. Similarly, the distinction between exogenous and endogenous uncertainty that I make in chapters 2 and 3 should be relevant for investments other than JVs, as the theoretical arguments hold regardless of the type of real option investment. Thus, it would be interesting to look at the effects of these two types of uncertainty in the context of other real option investments, such as applying for patents or founding new businesses. In so doing, however, the results of chapter 3 show that it is important to understand what sources of uncertainty are genuinely exogenous in each context.

REFERENCES

Adner, R. 2007. Resource reallocation processes. ***Advances in Strategic Management***, 24: 363-372.

Adner, R. and Levinthal, D.A. 2004a. What is not a real option: Considering boundaries for the application of real options to business strategy. ***Academy of Management Review***, 29(1): 74-85.

Adner, R. and Levinthal, D.A. 2004b. Real options and real tradeoffs. ***Academy of Management Review***, 29(1): 120-126.

Aharoni, Y. 1966. ***The foreign investment decision process***. Boston, MA: Harvard University Press.

Aiken, L.S. and West, S.G. 1991. ***Multiple regression: Testing and interpreting interactions***. Thousand Oaks, CA: Sage.

Amburgey, T.L. and Miner, A.S. 1992. Strategic Momentum: The Effects of Repetitive, Positional, and Contextual Momentum on Merger Activity. ***Strategic Management Journal***, 13(5): 335-348.

Anand, B.N. and Khanna, T. 2000. Do firms learn to create value? The case of alliances. ***Strategic Management Journal***, 21(3): 295-315.

Anderson, E. 1988. Strategic implications of Darwinian economics for selling efficiency and choice of integrated or independent sales forces. ***Management Science***, 34(5): 599–618.

Anderson, E. 1990. Two firms, one frontier: On assessing joint venture performance. ***Sloan Management Review***, 31(Winter), 19-30.

Anderson, E. and Gatignon, H. 1986. Modes of foreign entry: A transaction cost analysis and propositions. ***Journal of International Business Studies***, 17(1): 1-26.

Argote, L. 1999. ***Organizational learning: Creating, retaining and transferring knowledge***. Boston, MA: Kluwer.

Asquith, P., Bruner, R.F. and Mullins, D. 1983. The gains for bidding firms from merger. ***Journal of Financial Economics***, 11: 121-139.

Balakrishnan, S. and Koza, M.P. 1993. Information asymmetry, adverse selection and joint-ventures: Theory and evidence. ***Journal of Economic Behavior & Organization***, 20(1): 99-117.

Barkema, H.G., Baum, J.A.C. and Mannix., E.A. 2002. Management challenges in a new time. ***Academy of Management journal***, 45(5): 916-30.

Barkema, H.G., Bell, J.H.J. and Pennings, J.M. 1996. Foreign entry, cultural barriers, and learning. ***Strategic Management Journal***, 17(2): 151-166.

Barkema, H.G. and Schijven, M. 2008. How do firms learn to make acquisitions? A review of past research and an agenda for the future. ***Journal of Management***, 34(3): 594-634.

Barkema, H.G., Shenkar, O., Vermeulen, F. and Bell, J.H.J. 1997. Working abroad, working with others: How firms learn to operate international joint ventures. ***Academy of Management Journal***, 40(2): 426-442.

Barkema, H.G. and Vermeulen, F. 1997. What differences in the cultural backgrounds of partners are detrimental for international joint ventures? ***Journal of International Business Studies***, *28*(4): 845-864.

Baum, J.A.C. and Ingram, P. 1998. Survival-enhancing learning in the Manhattan hotel industry, 1898–1980. ***Management Science***, 44(7): 996-1016.

Beamish, P.W. 1993. The characteristics of joint ventures in the People's Republic of China. ***Journal of International Marketing***, 1(2): 29-48.

Beamish, P.W. and Banks, J.C. 1987. Equity joint ventures and the theory of the multinational-enterprise. ***Journal of International Business Studies***, 18(2):1-16.

Bell, G.K. 1995. Volatile exchange rates and the multinational firm: Entry, exit and capacity options. In L. Trigeorgis (Ed.). ***Real options in capital investment: Models, strategies, and applications*** (pp.163-184). Westport, CT: Praeger.

Berkovitch, E. and Narayanan, M.P. 1993. Motives for takeovers: An empirical investigation. ***Journal of Financial and Quantitative Analysis***, 28(3): 347-362.

Black, F. and Scholes, M. 1973. The pricing of options and corporate liabilities. ***Journal of Political Economy***, 81: 637-659.

Black, J.S. and Mendenhall, M. 1990. Cross-cultural training effectiveness: A review and a theoretical framework for future research. ***Academy of Management Review***, 15(1): 113-136.

Black, J.S., Mendenhall, M. and Oddou, G. 1991. Toward a comprehensive model of international adjustment: An integration of multiple theoretical perspectives. ***Academy of Management Review***, 16(2): 291-317.

Blodgett, L.L. 1991. Partner contributions as predictors of equity share in international joint ventures. ***Journal of International Business Studies***, 22(1): 63-78.

Blodgett, L.L. 1992. Factors in the instability of international joint ventures: An event history analysis. ***Strategic Management Journal***, 13(6): 475-481.

Boisot, M. and Child, J. 1999. Organizations as adaptive systems in complex environments: The case of China. ***Organization Science***, 10(3): 237-252.

Bollen, N.P.B. 1999. Real options and product life cycles. ***Management Science***, 45(5): 670-684.

Bowman, E.H. and Hurry, D. 1993. Strategy through the options lens: An integrated view of resource investments and the incremental-choice process. ***Academy of Management Review***, 18(4): 760-782.

Bowman, E.H. and Moskowitz, G.T. 2001. Real options analysis and strategic decision making. ***Organization Science***, 12(6): 772-777.

Boyd, B.K., Dess, G.G. and Rasheed, A.M.A. 1993. Divergence between archival and perceptual measures of the environment: Causes and consequences. ***Academy of Management Review***, 18(2) 204-226.

Brock, J.K-U. 2003. The 'power' of international business research. ***Journal of International Business Studies***, 34: 90–99.

Buckley, R and Casson, R. 1992. ***Multinational enterprises in the World Economy: Essays in honour of John Dunning***. Aldershot, UK: Edward Elgar.

Calori, R., Johnson, G. and Sarnin, P. 1994. CEOs cognitive maps and the scope of the organization. ***Strategic Management Journal***, 15(6): 437-457.

Campa, J.M. 1994. Multinational investment under uncertainty in the chemical processing industries. ***Journal of International Business Studies***, 25(3): 557-578.

Campbell, E. and Reuer, J.J. 2001. International alliance negotiations: Legal issues for general managers. ***Business Horizons***, 44(1): 19-26.

Campbell, J.Y., Lo, A.W. and MacKinlay, A.C. 1997. ***The econometrics of financial markets***. Princeton, NJ: Princeton University Press.

Cashen, L.H. and Geiger, S.W. 2004. Statistical power and the testing of null hypotheses: A review of contemporary management research and recommendations for future studies. ***Organizational Research Methods***, 7(2): 151-167.

Chadee, D.D. and Qiu, F. 2001.Foreign ownership of equity joint ventures in China: A pooled cross-section-time series analysis. ***Journal of Business Research***, 52(2): 123-133.

Chadee, D.D., Qiu, F. and Rose, E.L. 2003. FDI location at the subnational level: a study of EJVs in China. ***Journal of Business Research***, 56(10): 835-845**.**

Chan, S.H., Kensinger, J.W., Keown, A.J. and Martin, J.D. 1997. Do strategic alliances create value. ***Journal of Financial Economics***, 46: 199-221.

Chen, H., Hu, M.Y. and Hu, P.S. 2002. Ownership strategy of multinationals from ASEAN: the case of their investments in Sino-foreign joint ventures. ***Management International Review***, 42(3): 309-326.

Chi, T.L. 2000. Option to acquire or divest a joint venture. ***Strategic Management Journal***, 21(6): 665-687.

Chi, T.L. and Levitas, E. 2007. An examination of options embedded in a firm's patents: Value of dispersion in citations. ***Advances in Strategic Management***, 24, 405-427.

Chi, T.L. and McGuire, D.J. 1996. Collaborative ventures and value of learning: Integrating the transaction costs and strategic option perspectives on the choice of market entry modes. ***Journal of International Business Studies***, 27(2): 285-307.

Chi, T.L. and Roehl, T.W. 1997. The structuring of interfirm exchanges in business know-how: evidence from international collaborative ventures. ***Managerial and Decision Economics***, 18(4): 279-294.

Chi, T.L. and Seth, A. 2001. ***Joint ventures through a real options lens: New insights and future directions***. Paper presented at the Cooperative Strategies and Alliances Conference, Lausanne. June.

Chi, T.L. and Seth, A. 2002. Joint ventures through a real options lens. In F.J. Contractor and P. Lorange (Eds.). ***Cooperative strategies and alliances*** (pp.71-88). Amsterdam, The Netherlands: Elsevier Science.

Chi, T.L. and Seth, A. 2009. A dynamic model of the choice of mode for exploiting complementary capabilities. ***Journal of International Business Studies***, 40(3): 365-387.

Cohen, J. 1977. ***Statistical power analysis for the behavioural sciences***. New York, NY: Academic Press.

Cohen, J. 1990. Things I have learned (so far). ***American Psychologist***, 45(12): 1304-1312.

Cohen, W.M. and Levinthal, D.A. 1990. Absorptive capacity: A new perspective on learning and innovation. ***Administrative Science Quarterly***, 35: 128-152.

Colegrave, N. and Ruxton, G.D. 2003. Confidence intervals are a more useful complement to nonsignificant tests than are power calculations. ***Behavioral Ecology***, 14(3): 446-450.

Colegrave, N. and Ruxton, G.D. 2005. What hypothesis tests are not: a reply to Johnson. ***Behavioral Ecology***, 16(1): 325.

Contractor, F.J. and Lorange, P. 2002. ***Cooperative strategies and alliances***. Amsterdam, The Netherlands: Pergamon.

Cooper, D. J., Garvin, S. and Kagel, J. H. 1997. Signaling and adaptive learning in an entry limit pricing game. ***The RAND Journal of Economics***, 28(4): 662-683.

Cormier, S.M. and Hagman, J.D. 1987. ***Transfer of learning: Contemporary research and applications***. New York, NY: Academic Press.

Cronbach, L.J. and Meehl, P.E. 1955. Construct validity in psychological tests. ***Psychological Bulletin***, 52: 281-302.

Cunha, P.V. 2005. The value of cooperation: Studies on the performance outcomes of interorganizational alliances. ***Ph.D. dissertation***, Tilburg University, The Netherlands.

Cuypers, I.R.P., Cuypers, Y. and Martin, X. 2009. Learning from mergers and acquisitions: The roles of acquirer and target experience. ***Working paper***, Tilburg, The Netherlands: Tilburg University.

Cuypers, I.R.P. and Martin, X. 2006a. Strategic alliance governance: An extended real options perspective. In J.J. Reuer and A. Ariño (Eds.). ***Strategic alliances: Governance and contracts*** (pp.111-121). London, UK: Palgrave.

Cuypers, I.R.P. and Martin, X. 2006b. What makes and what does not make a real option? A study of international joint ventures. ***Academy of Management Best Paper Proceedings***, BPS, QQ1-QQ6.

Cuypers, I.R.P. and Martin, X. 2007. Joint ventures and real options: An integrated perspective. ***Advances in Strategic Management***, 24: 107-148.

Cuypers, I.R.P. and Martin, X. 2010. What makes and what does not make a real option? A study of equity shares in international joint ventures. ***Journal of International Business Studies***, 41(1).

Cuypers, Y. and Martin, X. 2008. Tie Versus Tie: When Do Corporate Development Activities Strengthen or Disrupt Buyers-Supplier Ties? ***Academy of Management Best Paper Proceedings***, OMT, 30: 1-6.

Cyert, R.M. and March, J.G. 1963. ***A behavioral theory of the firm***. Englewood Cliffs, NJ: Prentice-Hall.

Davis, L.E., North, D.C. and Smorodin, C. 1971. ***Institutional change and American economic growth***. Cambridge, UK: Cambridge University Press.

Dearborn, D.C. and Simon, H.A. 1958. Selective perception: A note on the department identification of executives. ***Sociometry***, 21: 140-144.

Delacroix, J. and Swaminathan, A. 1991. Cosmetic, speculative, and adaptive organizational change in the wine industry: a longitudinal-study. ***Administrative Science Quarterly***, 36(4): 631-661.

Delios, A. and Beamish, P.W. 1999. Ownership strategy of Japanese firms: transactional, institutional, and experience influences. ***Strategic Management Journal***, 20(10): 915-933.

Delios, A. and Beamish, P.W. 2001. Survival and profitability: the roles of experience and intangible assets in foreign subsidiary performance. ***Academy of Management Journal***, 44(5):1028-1038.

Dhanaraj, C. and Beamish, P. 2004. Effect of equity ownership on the survival of international joint ventures. ***Strategic Management Journal***, 25(3): 295–303.

Dixit, A. and Pindyck, R.S. 1994. ***Investment under uncertainty***. Princeton, NJ: Princeton University Press.

Dyer, J.H. 1997. Effective Interfirm Collaboration: How firms minimize transaction costs and maximize transaction value. ***Strategic Management Journal***, 18(7): 535-556.

Eiteman, D.K., Stonehill, A.I. and Moffett, M.H. 1998. ***Multinational business finance***. (8th edn). Reading, MA: Addison-Wesley.

Fagre, N. and Wells, L.T. 1982. Bargaining power of multinationals and host governments. ***Journal of International Business Studies***, 13(2), 9-23.

Fama, E.F., Fisher, L., Jensen, M.C. and Roll, R. 1969. The adjustment of stock prices to new information. ***International Economic Review***, 10(1): 1-21.

Fan, J.P.H., Morck, R., Xu, L.C. and Yeung, B. 2007. Does 'good government' draw foreign capital? Explaining China's exceptional foreign direct investment inflow. ***World Bank Policy Research Working Paper No. 4206***.

Financial Times 2005. Fortis lifts stake in Chinese joint venture. 21 December: 18.

Finkelstein, S. and Haleblian, J. 2002. Understanding acquisition performance: The role of transfer effects. ***Organization Science***, 13(1): 36-47.

Fiol, C.M. and Lyles, M.A. 1985. Organizational learning. ***Academy of Management Review***, 10(4): 803-13.

Fischhoff, B., Slovic, P. and Lichtenstein, S. 1977. Knowing with certainty: The appropriateness of extreme confidence. ***Journal of Experimental Psychology: Human Perception and Performance***, *3*: 552-564.

Fister, T. and Seth, A. 2007. The cost of flexibility: A real options view of employment contracts. ***Advances in Strategic Management***, 24: 373-402.

Folta, T.B. 1998. Governance and uncertainty: The trade-off between administrative control and commitment. ***Strategic Management Journal***, 19(11): 1007-1028.

Folta, T.B. and Miller, K.D. 2002. Real options in equity partnerships. ***Strategic Management Journal***, 23(1): 77-88.

Fudenberg, D. and Levine, D.K. 1998. ***The theory of learning in games***. Cambridge, MA: The MIT Press.

Gaba, V., Pan, Y.G. and Ungson, G.R. 2002. Timing of entry in international market: An empirical study of US fortune 500 firms in China. ***Journal of International Business Studies***, 33(1): 39-55.

Gatignon, H. and Anderson, E. 1988. The multinational corporation's degree of control over foreign subsidiaries: An empirical test of a transaction cost explanation. ***Journal of Law, Economics, and Organization***, 1(2): 305-336.

Geringer, J.M. 1991. Strategic determinants of partner selection criteria in international joint ventures. ***Journal of International Business Studies***, 22(1): 41-62.

Gomes-Casseres, B. 1990. Firm ownership preferences and host government restrictions: An integrated approach. ***Journal of International Business Studies***, 21(1), 1-22.

Greene, W.H. 2003. ***Econometric analysis***. (5th edn). Upper Saddle River, NJ: Prentice Hall.

Guillén, M.F. 2002. Structural inertia, imitation, and foreign expansion: South Korean firms and business groups in China, 1987-1995. ***Academy of Management Journal***, 45: 509-525.

Gulati, R. 1995. Does familiarity breed trust: the implications of repeated ties for contractual choice in alliances. ***Academy of Management Journal***, 38(1): 85-112.

Gulati, R. 1998. Alliances and networks. ***Strategic Management Journal***, 19(4), 293-317.

Gulati, R. and Wang, L. 2003. Size of the pie and share of the pie: Implications of structural embeddedness for value creation and value appropriation in joint ventures. ***Research in the Sociology of Organizations***, 20: 209-242.

Haleblian, J. and Finkelstein, S. 1999. The influence of organizational acquisition experience on acquisition performance: A behavioral learning perspective. ***Administrative Science Quarterly***, 44(1): 29-56.

Haleblian, J., Kim, J.-Y. and Rajagopalan, N. 2006. The influence of acquisition experience and performance on acquisition behavior: Evidence from the U.S. commercial banking industry. ***Academy of Management Journal***, 49: 357-370.

Hamel, G. 1991. Competition for competence and inter-partner learning within international strategic alliances. ***Strategic Management Journal***, 12: 83-103.

Harrigan, K.R. 1985. ***Strategies for joint ventures***. Lexington, MA: Lexington Books.

Harrigan, K.R. 1988a. Strategic alliances and partner asymmetries. ***Management International Review***, 28: 53-72.

Harrigan, K.R. 1988b. Joint ventures and competitive strategy. ***Strategic Management Journal***, 9(2): 141-158.

Haveman, H.A. 1992. Between a rock and a hard place: Organizational change and performance under conditions of fundamental environmental transformation. ***Administrative Science Quarterly***, 37: 48-75.

Haveman, H.A. 1993. Organizational size and change: Diversification in the savings and loan industry after deregulation. ***Administrative Science Quarterly***, 38: 20-50.

Henisz, W.J. 2000. The Institutional Environment for Economic Growth. ***Economics and Politics***, 12(1): 1-31.

Henisz, W.J. and Delios, A. 2001. Uncertainty, imitation, and plant location: Japanese multinational corporations, 1990-1996. ***Administrative Science Quarterly***, 46(3): 443-475.

Hennart, J.F. 1988. A transaction costs theory of equity joint ventures. ***Strategic Management Journal***, 9(4): 361-374.

Hennart, J.F. 1991. The transaction costs theory of joint ventures: an empirical study of Japanese subsidiaries in the United States. ***Management Science***, 37(4): 483-497.

Hennart, J.F. 1993. Explaining the swollen middle: Why most transactions are a mix of market and hierarchy. ***Organization Science***, 4(4): 529-547.

Hennart, J.F. and Larimo, J. 1998. The impact of culture on the strategy of multinational enterprises: does national origin affect ownership decisions?. ***Journal of International Business Studies***, 29(3): 515-538.

Hennart, J.-F., Roehl, T.W. and Zietlow, D.S. 1999. 'Trojan horse' or 'workhorse?' The evolution of US-Japanese joint ventures in the United States. ***Strategic Management Journal***, 20(1): 15-29.

Hennart, J.F. and Zeng, M. 2002. Cross-cultural differences and joint venture longevity. ***Journal of International Business Studies***, 33(4): 699-716.

Hoenig, J.M. and Heisey, D.M. 2001 The abuse of power: the pervasive fallacy of power calculations for data analysis. ***The American Statistician***, 55(1): 19-24.

Hofstede, G. 2001. ***Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations***. (2nd edn). Thousand Oaks, CA: Sage.

Hox, J.J. 1995. ***Applied multilevel analysis***. (2nd edn). Amsterdam, The Netherlands: TT-Publikaties.

Huchzermeier, A. and Cohen, M.A. 1996. Valuing operational flexibility under exchange rate risk. ***Operations Research***, 44(1): 100-113.

Hurry, D., Miller, A.T. and Bowman, E.H. 1992. Calls on high-technology: Japanese exploration of venture capital investments in the United States. ***Strategic Management Journal***, 13(2): 85-101.

Ingram, P. and Baum, J.A.C. 1997. Opportunity and constraint: Operations' learning from the operating and competitive experience of industries. ***Strategic Management Journal***, 18: 75-98.

Inkpen, A.C. and Beamish, P.W. 1997. Knowledge, bargaining power, and the instability of international joint ventures. ***Academy of Management Review***, *22*(1): 177-202.

International Currency Analysis. Various years. ***World currency yearbook***. Brooklyn, NY: International Currency Analysis.

International Monetary Fund. Various years. ***Annual report on exchange rate arrangements and exchange restrictions***. Washington D.C.: IMF.

Ireland, R.D., Hitt, M.A., Bettis, R.A. and de Porras, D.A. 1987. Strategy formulation Processes: differences in perception of strengths and weaknesses indicators and environmental uncertainty by managerial level. ***Strategic Management Journal***, 8(5): 469-485.

Ireland, R.D., Hitt, M.A. and Vaidyanath, D. 2002. Alliance management as a source of competitive advantage. ***Journal of Management***, 28(3): 413-446.

Jackson, S.E. 1996. The consequences of diversity in multidisciplinary work teams. In West, M. A. (Ed.). ***The Psychology of Groups at Work***: Chichester, England: John Wiley & Sons.

Janney, J.J. and Dess, G.G. 2004. Can real-options analysis improve decision-making? Promises and pitfalls. ***Academy of Management Executive***, 18(4), 60-75.

Jarrow, R. and Turnbull, S. 2000. ***Derivative securities***. (2nd edn). Cincinnati, OH: South-Western College Publishing.

Jensen, M. and Meckling, W.H. 1976. Theory of firm: Managerial behavior, agency costs and ownership structure. ***Journal of Financial Economics***, 3(4): 305-360.

Johnson D.H. 2005. What hypothesis tests are not: a response to Colegrave and Ruxton. ***Behavioral Ecology***, 16(1): 204–205.

Kale, P., Dyer, J. H. and Singh, H. 2002. Alliance capability, stock market response, and long-term alliance success: The role of the alliance function. ***Strategic Management Journal***, 23(8): 747-767.

Kale, P., and Singh, H. 2007. Building firm capabilities through learning: The role of the alliance learning process in alliance capability and firm-level alliance success. ***Strategic Management Journal***, 28: 981-1000.

Katz, S.I. 1972. ***Exchange risk under fixed and flexible exchange rates***. New York, NY: New York University.

Kester, W.C. 1981. ***Growth options and investment: A dynamic perspective on the firm's allocation of resources***. Cambridge, MA: Unpublished PhD dissertation, Harvard University.

Killing, P. 1980. Technology acquisition: License agreement or joint venture. ***Columbia Journal of World Business***, 15: 38-46.

Killing, P. 1982. How to make a global joint-venture work. ***Harvard Business Review***, 60: 120-127.

Killing, P. 1983. ***Strategies for joint ventures***. New York, NY: Praeger Publishers.

Knight, F.H. 1921. ***Risk, uncertainty and profit***. Chicago, IL: University of Chicago Press.

Kobrin, S.J. 1987. Testing the bargaining hypothesis in the manufacturing sector in developing countries. ***International Organization***, 41(4): 609-638.

Kogut, B. 1988. Joint ventures: Theoretical and empirical perspectives. ***Strategic Management Journal***, 9(4): 319-332.

Kogut, B. 1991. Joint ventures and the option to expand and acquire. ***Management Science***, 37(1): 19-33.

Kogut, B. and Kulatilaka, N. 1994. Options thinking and platform investments: Investing in opportunity. ***California Management Review***, *36(*2): 52-71.

Kogut, B. and Singh, H. 1988. The effect of national culture on the choice of entry mode. ***Journal of International Business Studies***, 19(3): 411-432.

Koh, J. and Venkatraman, N. 1991. Joint venture formations and stock-market reactions: An assessment in the information technology sector. ***Academy of Management Journal***, 34(4): 869-892.

Kotabe, M., Martin, X. and Domoto, H. 2003. Gaining from vertical partnerships: Knowledge transfer, relationship duration and supplier performance improvement in the U.S. and Japanese automotive industries. ***Strategic Management Journal***, 24(4): 293-316.

Koussis, N., Martzoukos, S.H. and Trigeorgis, L. 2007. Real R&D options with time-to-learn and learning-by-doing. ***Annals of Operations Research***, 151:29-55.

Krishnan, R., Martin, X. and Noorderhaven, N.G. 2006. When does trust matter to alliance performance? ***Academy of Management Journal***, 49(5): 894-917.

Kulatilaka, N. 1995. The value of flexibility: A general model of real options. In L. Trigeorgis (Ed.). ***Real options in capital investment: Models, strategies, and applications*** (pp.89-108). Westport, CT: Praeger.

Kulatilaka, N. and Perotti, E.C. 1998. Strategic growth options. ***Management Science***, 44(8): 1021-1031.

Kumar, S.M.V. 2005. Value from acquiring and divesting a joint venture. ***Strategic Management Journal***, 26: 321-331.

Kumar, S.M.V. 2007. Asymmetric Wealth Gains in Joint Ventures: Theory and Evidence. ***Finance Research Letters.*** 4(1): 19-27.

Kumar, S.M.V. 2010. Differential Gains Between Partners in Joint Ventures: The Role of Resource Appropriation and Private Benefits. ***Organization science, Forthcoming***.

Lane, H. W. and Beamish, P. W. 1990. Cross-cultural cooperative behavior in joint ventures in LDCs. ***Management International Review***, 30: 87-102.

Lane, P.J., Cannella, A.A. and Lubatkin, M.H. 1998. Agency problems as antecedents to unrelated mergers and diversification: Amihud and Lev reconsidered. ***Strategic Management Journal***, 19(6): 555-578.

Lane, P.J., Salk, J.E. and Lyles, M.A. 2001. Absorptive capacity, learning and performance in international joint ventures. ***Strategic Management Journal***, 22(12): 1139-1161.

Langer, E.J. and Roth, J. 1975. The effect of sequence of outcomes in a chance task on the illusion of control. ***Journal of Personality and Social Psychology***, 32(6): 951-955.

Leiblein, M.J. 2003. The choice of organizational governance form and performance: Predictions from transaction cost, resource-based, and real options theories. ***Journal of Management***, 29(6): 937-961.

Leiblein, M.J., Reuer, J.J. and Dalsace, F. 2002. Do make or buy decisions matter? The influence of organizational governance on technological performance. ***Strategic Management Journal***, 23(9), 817-833.

Levitt, B. and March, J.G. 1988. Organizational learning. ***Annual Review of Sociology***, 14: 319-340.

Li, J. 2007. Real options theory and international strategy: A critical review. ***Advances in Strategic Management,*** **24**: 71-106.

Li, Y., B. James, Madhavan, R. and Mahoney, J.T. 2007. Real options: Taking stock and looking ahead. ***Advances in Strategic Management***, 24: 31-66.

Lu, J.W. 2002. Intra- and inter- organizational imitative behavior: institutional influences on Japanese firms' entry mode choice. ***Journal of International Business Studie*****s**, 33(1): 19-37.

Lu, J.W. and Hébert, L. 2005. Equity control and the survival of international joint ventures: A contingency approach. ***Journal of Business Research***, 58(6): 736-745.

Luo, Y. 2005. Transactional characteristics, institutional environment and joint venture contracts. ***Journal of International Business Studies***, 36(2): 209-230.

Luo, Y.D. 1997. Partner selection and venturing success: The case of joint ventures with firms in the People's Republic of China. ***Organization Science***, 8(6): 648-662.

Madhavan, R. and Prescott, J.E. 1995. Market value impact of joint ventures: The effect of industry information-processing load. ***Academy of Management Journal***, 38(3): 900-915.

Makino, S. and Beamish, P.W. 1998. Performance and survival of joint ventures with non-conventional ownership structures. ***Journal of International Business Studies***, 29(4): 797-818.

Makino, S., Chan, C.M., Isobe, T. and Beamish P.W. 2007. Intended and unintended termination of international joint ventures. ***Strategic Management Journal***, 28(11): 1113-1132.

March, J.G. and Simon, H.A. 1958. ***Organizations***. New York, NY: Wiley.

Martin, X. 2002. Towards a research agenda on hybrid organizations: Research and development, production and marketing interfaces. In M. Kotabe and P.S. Aulakh (Eds.). ***Emerging issues in international business research*** (pp.241-259). Cheltenham, UK and Northampton, MA: Edward Elgar Publishing.

Martin, X. and Mitchell, W. 1998. The influence of local search and performance heuristics on new design introduction in a new product market. ***Research Policy***, 26(8): 753-771.

Martin, X., Mitchell, W. and Swaminathan, A. 1994. Recreating and extending buyer-supplier links following international expansion. ***Advances in Strategic Management***, 10: 47-72.

Martin, X., Mitchell, W. and Swaminathan, A. 1995. Recreating and extending Japanese automobile buyer-supplier links in North America. ***Strategic Management Journal,*** 16(8): 589-620.

Martin, X. and Park, N.K. 2004. Bounded momentum in the formation of strategies: The case of alliances. ***Working paper***, Seoul, Korea: KAIST.

Martin, X. and Salomon, R. 2002. Knowledge transfer capacity and cooperative strategies: When should firms leverage tacit knowledge through licensing and alliances? In F.J. Contractor and P. Lorange (Eds.). ***Cooperative strategies and alliances*** (pp.729-748). Amsterdam and New York: Pergamon / Elsevier Science.

Martin, X. and Salomon, R. 2003a. Knowledge transfer capacity and its implications for the theory of the multinational corporation. ***Journal of International Business Studies***, 34(4): 356-373.

Martin, X. and Salomon, R. 2003b. Tacitness, learning and international expansion: A study of foreign direct investment in a knowledge-intensive industry. ***Organization Science***, 14(3): 297-311.

Martin, X., Swaminathan, A. and Mitchell, W. 1998. Organizational evolution in an interorganizational environment: Incentives and constraints on international expansion strategy. ***Administrative Science Quarterly***, 43(3): 566-601.

McConnell, J.J. and Nantell, T.J. 1985. Corporate combinations and common stock returns: The case of joint ventures. ***Journal of Finance***, 40: 519–536.

Merchant, H. and Schendel, D. 2000. How do international joint ventures create shareholder value? ***Strategic Management Journal***, 21(7): 723-737.

Merton, R.C. 1973. The theory of rational option pricing. ***Bell Journal of Economics***, 4: 141-183.

Miller, K.D. 1992. A framework for integrated risk management in international business. ***Journal of International Business Studies***, 23(2): 311-331.

Miller, K.D. and Folta, T.B. 2002. Option value and entry timing. ***Strategic Management Journal***, 23(7): 655-665.

Miller, K.D. and Shapira, Z. 2004. An empirical test of heuristics and biases affecting real option valuation. ***Strategic Management Journal***, 25(3): 269-284.

Miner, A.S. and Haunschild, P.R. 1995. Population level learning. ***Research in Organizational Behavior***, 17: 115-166.

Mitchell, W. and Singh, K. 1992. Incumbents use of pre-entry alliances before expansion into new technical subfields of an industry. ***Journal of Economic Behavior & Organization***, 18(3): 347-72.

Mody, A. 1993. Learning through alliances. ***Journal of Economic Behavior & Organization***, 20(2): 151-70.

MOFERT. Various years. ***Almanac of foreign economic relations and trade of China***. Hong Kong: China Resource Trade Consultancy.

MOFTEC. Various years. ***Almanac of foreign economic relations and trade of China***. Hong Kong: China Resource Trade Consultancy.

Morck, R., Schleifer, A. and Vishny, R.W. 1990. Do managerial motives drive bad acquisitions? ***Journal of Finance***, (45): 31-48.

Mowery, D.C., Oxley, J.E. and Silverman, B.S. 1996. Strategic alliances and interfirm knowledge transfer. ***Strategic Management Journal***, 17(Winter Special Issue): 77-91.

Murphy, K.R. and Myors, B. 2004. ***Statistical power analysis: A simple and general model for traditional and modern hypothesis tests***. (2nd edn). Mahwah, NJ: Lawrence Erlbaum Associates.

Myers, S.C. 1977. Determinants of corporate borrowing. ***Journal of Financial Economics***, 5(2): 147-175.

Nakamura, M., Shaver, J.M. and Yeung, B. 1996. An empirical investigation of joint venture dynamics: Evidence from US-Japan joint ventures. ***International Journal of Industrial Organization***, 14(4): 521-541.

Nakamura, M. and Yeung, B. 1994. On the determinants of foreign ownership shares: evidence from US Firms' joint ventures in Japan. ***Managerial and Decision Economics***, 15(2), 95-106.

Nelson, R. R. and Winter, S.G. 1982. ***An evolutionary theory of economic change***. Cambridge, MA: Harvard University Press.

Nerkar, A., Paruchuri, S. and Khaire, M. 2007. Business method patents as real options: Value and disclosure as drivers of litigation. ***Advances in Strategic Management***, 24: 247-274.

Neter, J, Wasserman W. and Kutner M.H. 1985. ***Applied Linear Statistical Models***. (2nd edn). Homewood, IL: Homewood.

Nickerson, J.A. and Silverman, B.S. 2003. Why firms want to organize efficiently and what keeps them from doing so: Inappropriate governance, performance, and adaptation in a deregulated industry. ***Administrative Science Quarterly***, 48(3): 433-465.

Olk, P. 2002. Evaluating strategic alliance performance. In F.J. Contractor and P. Lorange (Eds.). ***Cooperative strategies and alliances*** (pp.119-144). Amsterdam, The Netherlands: Elsevier Science.

Oriani, R. and Sobrero, M. 2008. Uncertainty and the market value of R&D within real options logic. ***Strategic Management Journal***, 29(4): 343-361.

Oxelheim, L. and Wihlborg, C.G. 1987. ***Macroeconomic uncertainty: International risks and opportunities for the corporation***. New York, NY: John Wiley & Sons.

Oxelheim, L. and Wihlborg, C.G. 1991. Corporate strategies in a turbulent world economy. ***Management International Review***, 31(4): 293-315.

Oxley, J.E. 1997. Appropriability hazards and governance in strategic alliances: A transaction cost approach. ***Journal of Law Economics & Organization***, 13(2): 387-409.

Oxley, J.E. 1999. Institutional environment and the mechanisms of governance: the impact of intellectual property protection on the structure of inter-firm alliances. ***Journal of Economic Behavior & Organization***, 38(3): 283-309.

Oxley, J.E. and Sampson, R.C. 2004. The scope and governance of international R&D alliances. ***Strategic Management Journal***, 25(8-9): 723-749.

Pan, Y.G. 1996. Influences on foreign equity ownership level in joint ventures in China. ***Journal of International Business Studies***, 27(1): 1-26.

Pan, Y.G. 2002. Equity ownership in international joint ventures: the impact of source country factors. ***Journal of International Business Studies***, 33(2): 375-84.

Pangarkar, N. 2003. Determinants of alliance duration in uncertain environments: The case of the biotechnology sector. ***Long Range Planning***, 36(3): 269-284.

Park, N.K. 2004. A guide to using event study methods in multi-country settings. ***Strategic Management Journal***, 25: 655-668.

Park, S.H. and Ungson, G.R. 1997. The effect of national culture, organizational complementarity, and economic motivation on joint venture dissolution. ***Academy of Management Journal***, 40(2): 279-307.

Parkhe, A. 1991. Interfirm diversity, organizational learning, and longevity in global strategic alliances. ***Journal of International Business Studies***, 22(4): 579-601.

Parkhe, A. 1993. Strategic alliance structuring: A game theoretical and transaction cost examination of interfirm cooperation. ***Academy of Management Journal***, 36(4): 794-829.

Pawlina, G. and Kort, P.M. 2006. Real options in an asymmetric duopoly: Who benefits from competitive advantage? ***Journal of Economics & Management Strategy***, **15**(1) 1-35.

Pelled, L.H., Eisenhardt, K.M. and Xin, K.R. 1999. Exploring the black box: An analysis of work group diversity, conflict, and performance. ***Administrative Science Quarterly***, 44(1): 1-28.

Perkins, S., Morck, R. and Yeung, B. 2008. Innocents abroad: The hazards of international joint ventures with pyramid group firms. ***Working paper***, available at SSRN: http;//ssrn.com/abstract=1097265.

Pick, F. Various years. ***Pick's currency yearbook***, New York, NY: Pick Publishing Corporation.

Pindyck, R.S. 1988. Irreversible commitment, capacity choice, and the value of the firm. ***American Economic Review***, 78: 967-985.

Pisano, G.P. 1989. Using equity participations to support exchange: Evidence from the biotechnology industry. ***Journal of Law, Economics and Organization***, 5: 109-126.

Pisano, G.P. 1990. The R&D boundaries of the firm: An empirical analysis. ***Administrative Science Quarterly***, 35(1): 153-176.

Pisano, G.P., Russo, M.V. and Teece, D.J. 1988. Joint ventures and collaborative relationships in the telecommunications equipment industry. In D. Mowery (Ed.). ***International collaborative ventures in U.S. manufacturing*** (pp.23-70). Cambridge, MA: Ballinger.

Rao, A. and Schmidt, S.M. 1998. A behavioral perspective on negotiating international alliances. ***Journal of International Business Studies***, 29(3): 665-694.

Reinhart, M.C. and Rogoff, K.S. 2004. The modern history of exchange rate arrangements: A reinterpretation. ***Quarterly Journal of Economics***, 119(1): 1-48.

Reuer, J.J. 2000. Parent firm performance across international joint venture life-cycle stages. ***Journal of International Business Studies***, 29: 263-279.

Reuer, J.J. 2002. How real are real options? The case of international joint ventures. In M.A. Hitt, R. Amit and R.D. Nixon (Eds.). ***Creating value: Winners in the new business environment*** (pp.61-84). Oxford, UK: Blackwell Publishing.

Reuer, J.J. and Ariño, A. 2002. Contractual renegotiations in strategic alliances. ***Journal of Management***, 28(1): 47-68.

Reuer, J.J. and Koza, M.P. 2000. On lemons and indigestibility: Resource assembly through joint ventures. ***Strategic Management Journal***, 21(2): 81-88.

Reuer, J.J. and Leiblein, M.J. 2000. Downside risk implications of multinationality and international joint ventures. ***Academy of Management Journal***, 43(2): 203-214.

Reuer, J.J., Park, K.M. and Zollo, M. 2002. Experiential learning in international joint ventures: The roles of experience heterogeneity and venture novelty. In F. Contractor, and P. Logrange (Eds.). ***Cooperative strategies and alliances***: Elsevier Science.

Reuer, J.J. and Tong, T.W. 2005. Real options in international joint ventures. ***Journal of Management***, 31(3): 403-423.

Reuer, J.J. and Tong, T.W. 2007. How do real options matter? Empirical research on strategic investments and firm performance. ***Advances in Strategic Management***, 24: 145-173.

Reuer, J.J., Zollo, M. and Singh, H. 2002. Post-formation dynamics in strategic alliances. ***Strategic Management Journal***, 23(2): 135-151.

Roberts, K. and Weitzman, M.L. 1981. Funding criteria for research, development, and exploration projects. ***Econometrica***, 49: 1261-1287.

Royall R.M. 1997. ***Statistical evidence: a likelihood paradigm***. New York, NY: Chapman and Hall.

Sampson, R.C. 2004. The cost of misaligned governance in R&D alliances. ***Journal of Law Economics & Organization***, 20(2): 484-526.

Sarkar, M.B., Echambadi, R. and Ford, C. 2003. ***Learning to collaborate: The effects of experiential and vicarious learning on alliance performance***. Paper presented at the Academy of Management, Seattle.

Schwenk, C.R. 1984. Cognitive simplification processes in strategic decision-making. ***Strategic Management Journal,*** *5*(2): 111-128.

Seth, A. 1990a. Value creation in acquisitions: A re-examination of performance issues. ***Strategic Management Journal***, 11(2): 99-115.

Seth, A. 1990b. Sources of value creation in acquisitions: An empirical investigation. ***Strategic Management Journal***, 11(6): 431-446.

Seth, A. and Chi, T.L. 2002. Joint ventures through a real options lens. In F.J. Contractor and P. Lorange (Eds.). ***Cooperative strategies and alliances*** (pp.101-1160). Amsterdam, The Netherlands: Pergamon.

Seth, A. and Chi, T.L. 2005. What does a real options perspective add to the understanding of strategic alliances? In O. Shenkar and J.J. Reuer (Eds.). ***Handbook of strategic alliances*** (pp.101-116). Thousand Oaks, CA: Sage Publications.

Seth, A. and Kim, S.-M. 2001. Valuation of international joint ventures: A real options approach. In F. Contractor (Ed.). ***Valuation of intangible assets in international operations*** (pp.147-170). Westport, CT: Quorum Books.

Seth, A., Song, K.P. and Pettit, R.R. 2000. Synergy, managerialism or hubris? An empirical examinations of motives for foreign acquisitions of U.S. firms. ***Journal of International Business***, 31(3): 387-405.

Seth, A., Song, K.P. and Pettit, R.R. 2002. Value creation and destruction in cross-Border acquisitions: An empirical analysis of foreign acquisitions of U.S. firms. ***Strategic Management Journal***, 23: 921-940.

Shan, W. 1991. Environmental risks and joint venture sharing arrangements. ***Journal of International Business Studies***, 22(4): 555-578.

Shapira, Z. 1995. ***Risk taking: A managerial perspective***. New York, NY: Russell Sage Foundation.

Shaver, J.M. 1998. Accounting for endogeneity when assessing strategy performance: Does entry mode choice affect FDI survival? ***Management Science***, 44(4): 571-585.

Shaver, J.M. 2008. Organizational significance. ***Strategic Organization***, **6**(2): 185-193.

Shaver, J.M., Mitchell, W. and Yeung, B. 1997. The effect of own-firm and other-firm experience on foreign direct investment survival in the United States, 1987–1992. ***Strategic Management Journal***, 18: 811-824.

Shen, J.-C. and Reuer, J.J. 2005. Adverse selection in acquisitions of small manufacturing firms: A comparison of private and public targets. ***Small Business Economics***, 24(4): 393-407.

Shenkar, O. and Zeira, Y. 1992. Role-conflict and role ambiguity of chief executive officers in international joint ventures. ***Journal of International Business Studies***, 23(1): 55-75.

Sherman, S.J., Cialdini, R.B., Schwartzman, D.F. and Reynolds, K.D. 2002. Imagining can heighten or lower the perceived likelihood of contracting a disease: The mediating effect of ease of imagery. In T. Gilovich, D. Griffin and D. Kahneman (Eds.). ***Heuristics and biases: The psychology of intuitive judgment*** (pp. 98-102). Cambridge, UK: Cambridge University Press.

Simon, H.A. 1955. A behavioral model of rational choice. ***Quarterly Journal of Economics***, 69: 99-118.

Stopford, J.M. and Wells, L.T. 1972. ***Managing the multinational enterprise: Organization of the firm and ownership of the subsidiaries***. New York, NY: Basic Books.

Thompson, L. 1990. An examination of naive and experienced negotiators. ***Journal of Personality & Social Psychology***, 59(1): 82-90.

Tong, T.W., Reuer, J.J. and Peng, M.W. 2008. International joint ventures and the value of growth options ***Academy of Management Journal***, 51(5): 1014-1029.

Tosi, H., Aldag, R. and Storey, R. 1973. On the measurement of the environment: An assessment of the Lawrence and Lorsch environmental uncertainty subscale. ***Administrative Science Quarterly***, 18(1): 27-36.

Trigeorgis, L. 1993. Real options and interactions with financial flexibility. ***Financial Management***, 22(3): 202-224.

Trigeorgis, L. 1995. Real options: An overview. In L. Trigeorgis (Ed.). ***Real options in capital investment: Models, strategies, and applications*** (pp.1-30). Westport, CT: Praeger.

Tse, D.K., Pan, Y.G. and Au, K.Y. 1997. How MNCs choose entry modes and form alliances: the China experience. ***Journal of International Business Studies***, 28(4): 779-805.

Tversky, A. and Kahneman, D. 1974. Judgment under uncertainty: Heuristics and biases. ***Science***, 185(4157): 1124-1131.

Tversky, A. and. Kahneman, D. 1982a. Judgment under uncertainty: Heuristics and biases. In D. Kahneman, P. Slovic and A. Tversky (Eds.). ***Judgment under uncertainty: Heuristics and biases*** (pp.3-20). Cambridge, UK: Cambridge University Press.

Tversky, A. and Kahneman, D. 1982b. Availability: A heuristic for judging frequency and probability. In D. Kahneman, P. Slovic and A. Tversky (Eds.). ***Judgment under uncertainty: Heuristics and biases*** (pp.163-178). Cambridge, UK: Cambridge University Press.

UNCTAD. Various years. ***World investment report***. Geneva, Switzerland.

Van Mieghem, J.A. 1999. Coordinating investment, production, and subcontracting. ***Management Science***, **45**(7): 954-971.

Vassolo, R.S., Anand, J. and Folta, T.B. 2004. Non-additivity in portfolios of exploration activities: A real options-based analysis of equity Alliances in biotechnology. *Strategic Management Journal* **25**(11): 1045–1061.

Walker, G. and Weber, D. 1984. A transaction cost approach to make-or-buy decisions. ***Administrative Science Quarterly***, 29(3): 373-391.

Walker, G. and Weber, D. 1987. Supplier competition, uncertainty, and make-or-buy decisions. ***Academy of Management Journal***, 30(3): 589-596.

Wang, L. and Zajac, E.J. 2007. Alliance or acquisition? A dyadic perspective on interfirm resource combinations. ***Strategic Management Journal***, 28(13): 1291-1317.

Weber, Y., Shenkar, O. and Raveh, A. 1996. National and corporate cultural fit in mergers/acquisitions: An exploratory study. ***Management Science***, 42(8): 1215-1227.

Whetten, D.A. 1981. Interorganizational relations: A review of the field. ***Journal of Higher Education***, 52: 1-28.

Wholey, D.R. and Brittain, J. 1989. Characterizing environmental variation. ***Academy of Management Journal***, 32(4): 867-82.

Williamson, O.E. 1985. ***The economic institutions of capitalism***. New York, NY: Free Press.

Williamson, O.E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. ***Administrative Science Quarterly***, 36(2): 269-296.

Yan, A.M. and Gray, B. 1994. Bargaining power, management control, and performance in United States-China joint ventures: A comparative case study. ***Academy of Management Journal***, 37(6): 1478-1517.

Zajac, E.J. and Olsen, C. 1993. From transaction cost to transaction value analysis: implications for the study of interorganizational strategies. ***Journal of Management Studies***, 30: 131–145.

Zollo, M. and Reuer, J.J. 2008. Experience spillovers across corporate development activities. ***Working paper***.

SAMENVATTING (SUMMARY IN DUTCH)

Dit proefschrift bestaat uit zes hoofdstukken: een inleiding, vier gerelateerde studies en een conclusie. Er bestaan veel toetredingsvormen zoals export, joint ventures (JVs) en 100% dochterondernemingen. In dit proefschrift onderzoek ik hoe verschillende soorten onzekerheid en ervaring de verschillende fases in de levenscyclus van een JV beïnvloeden. Om de invloed van deze factoren te bestuderen maak ik gebruik van verschillende theoretische stromingen zoals learning, transaction cost, en reële optie theorie.

In de eerste studie (hoofdstuk 2) geef ik een gedetailleerd overzicht van de bestaande literatuur betreffende JVs en reële opties. Hiermee lever ik drie bijdragen aan de huidige literatuur. Allereerst kijk ik naar verschillende alternatieve theorieën zoals *learning*, *bargaining*, *transaction cost*, en *agency theory* en bespreek ik hoe deze theorieën reële optie theorie aanvullen. Vervolgens integreer ik een aantal argumenten die tot op heden enkel gebruikt zijn om naar één enkele fase van de levenscyclus van een JV te kijken met de bedoeling om de integratie binnen de reële optie literatuur te bevorderen. Tenstotte bestudeer ik hoe de subjectieve waarneming van onzekerheid een invloed heeft op hoe managers investeringen in reële opties doen. Gebaseerd op deze bevindingen suggereer ik verschillende mogelijkheden voor toekomstig onderzoek.

In de tweede studie (hoofdstuk 3) onderzoek ik empirisch de grenzen van reële optie theorie. Ik argumenteer dat exogene soorten onzekerheid een invloed hebben op het aandeel dat buitenlandse investeerders nemen in buitenlandse JVs. Ik verwacht echter geen invloed van endogene soorten onzekerheid. Ik test mijn hypotheses op data over 6472 JVs in China die opgericht zijn tussen 1979 en 1996. Mijn resultaten tonen aan dat reële optie theorie van toepassing is wanneer onzekerheid exogeen is maar niet wanneer onzekerheid endogeen is. Deze bevindingen dragen bij tot een meer accuraat gebruik van reële optie theorie in de praktijk.

In mijn derde studie (hoofdstuk 4) kijk ik naar de determinanten van JV instabiliteit. Ik verwacht dat bedrijven hun aandeel in hun buitenlandse dochterondernemingen aanpassen wanneer hun aandeel niet meer in overeenstemming is met de externe omgeving van de dochteronderneming. Verder argumenteer ik dat verschillende soorten ervaringen een verschillend effect hebben op de stabiliteit van JVs. Gebruikmakende van data over Japanse buitenlandse dochterondernemingen, vind ik bewijs voor mijn hypotheses.

In de vierde en laatste studie (hoofdstuk 5) bestudeer ik hoe bedrijven waarde kunnen creëren of eigenmaken in hun JVs. Ik maak een theoretisch onderscheid tussen het creëren van waarde en het eigenmaken van waarde. Aan de hand van dit onderscheid argumenteer ik dat asymmetrische hoeveelheden ervaring tussen beide moederbedrijven in een JV een negatieve impact hebben op de creatie van waarde, maar positief zijn voor het meer ervaren moederbedrijf als het op het eigenmaken van waarde aankomt. Mijn resultaten gebaseerd op de analyse van 76 JVs bevestigen mijn hypotheses.

Als een geheel dragen mijn vier studies bij tot de literatuur door het verdiepen van onze kennis over hoe verschillende soorten onzekerheid en ervaringen een invloed hebben op verschillende aspecten van JVs, zoals hun structuur, stabiliteit en rendement.